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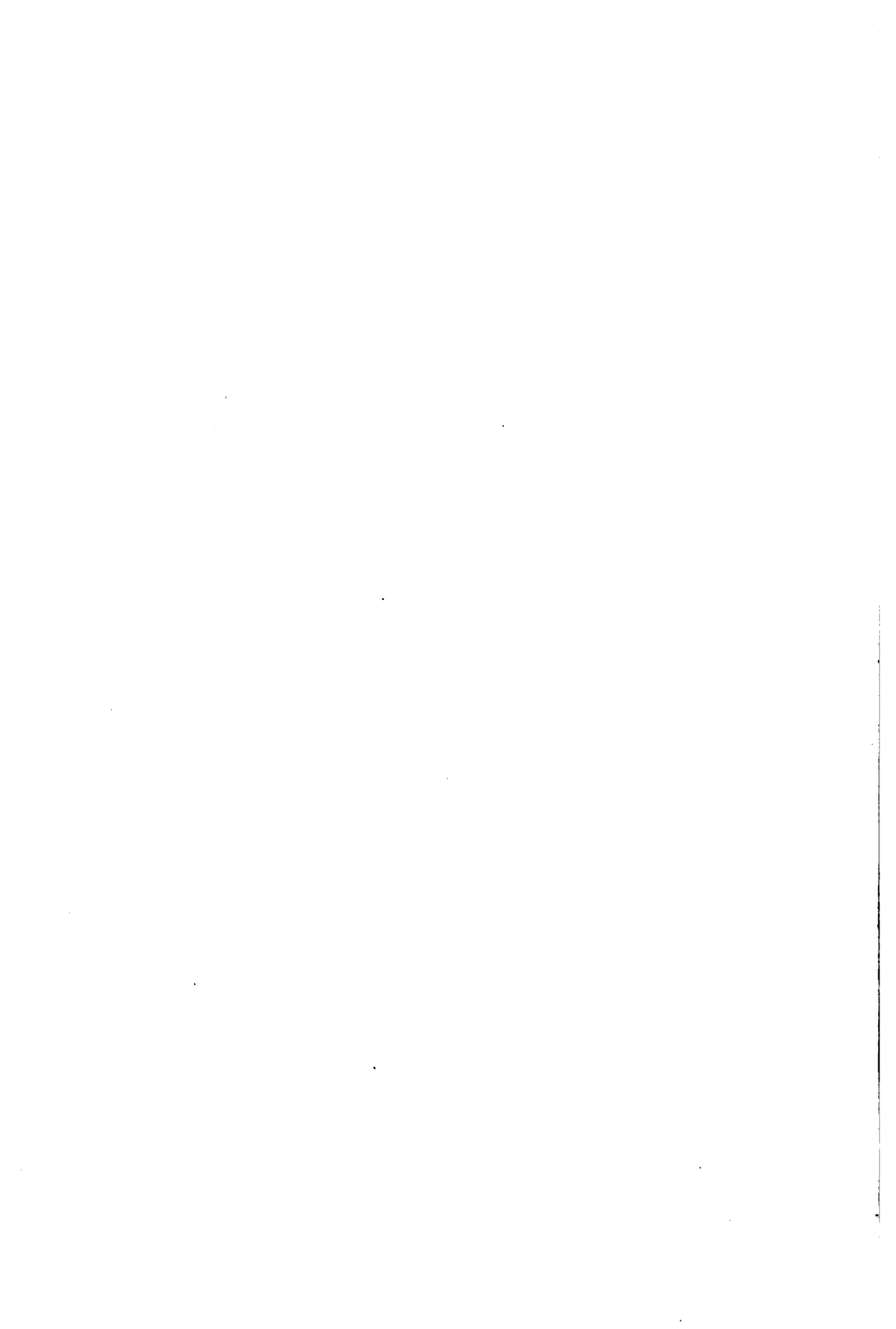
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How to Find Costs in Printing

A. E. Davis







How to Find Costs in Printing

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A. E. Davis
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Chapter One

Why Every Printer Should Use a Cost System

WHEN conducted on correct business principles the printing business returns profits as large as most others in which an equal amount of capital is invested. But, even so, the goal of success is hard to reach, and the road thereto is strewn with wrecks innumerable. This, of course, is true of all lines of business; tho, unfortunately, the failures in our own are more numerous than in almost any other; and, at the same time, the percentage of those who are able to eke out only a mere existence is greater than in any branch of industry except low-grade lines such as shoe-shops, barber-shops and the like.

Ours is one of the greatest industries from any viewpoint. Measured by its power to promote the happiness and welfare of the human race, it is the greatest industry of them all. It is mortifying to be compelled to compare the business of even its smallest unit to that of the cobbler. But facts, stubborn things that they are, must be faced as we find them.

Every one has heard it said time and again that the unsatisfactory conditions existing in our own trade are the printers' own fault. While the statement is true, there is ample excuse for the fault. Continuing our comparison with the barber and the cobbler, the fact should

2 The peculiar business of printing

be noted that in both those lines the work consists of doing the same thing over and over again. No great amount of money can be made in either line, because, if the price of a shave passes a certain figure, men will shave themselves; while, in the case of shoes, if the price of the mending is not comparatively low, we will buy a new pair instead of having the old ones repaired. In both lines, however, the net cost of each job can be determined to a nicety; and tho the profits, in the nature of things, are and must be small, still there are profits. For whenever the cost is known a profit is made; or, if it cannot be, the reason is not far to seek, and will usually be found to be a lack of customers. The cause becomes apparent almost immediately. If it be too few customers, the remedy is to remove to a location in which there are a greater number of people wanting shaves or shoe-repairing. The lack of profit is never due to the fact that the shave or the repairing is sold at less than cost thru ignorance of what the cost is.

In our own line, however, conditions are not at all the same. Perhaps ninety per cent of the jobs that enter the printing office are different from anything ever done before. Nearly every piece of work presents new problems, and in their solution neither precedent nor universal or even occasional practice will help us. Our only guide is our general knowledge of typesetting, presswork and binding—not as they have been applied to the job in hand, but as our knowledge of them has been applied to other and different jobs. In a word, so far at least as the time that will be required for the work is concerned, the best we can do is to make a guess. Printers call these

guesses "estimates." So that time-honored custom may be disturbed as little as possible, we will continue to call them estimates.

Until within the past few years, too, the average printer knew as little about the cost of an hour's time as he did (and does) about the time a given job will take. Ninety-five per cent of us still know as little. Seventy-five per cent of those who know not will calmly tell you they know positively what every job costs, and that, barring occasional errors, they make a profit on every job. I have had printer after printer make this claim when I knew that he could not buy paper and other supplies except by paying spot cash for them. I personally know many others who claim the same thing, but who, were their accounts properly kept, would find that in place of making a profit they are suffering a loss.

How, you ask, can a printer who is losing money remain in business? The answer is simple: he fails to take account of the interest on his investment and the depreciation of his plant, and takes for profit the money that should be set aside to take care of these large expense items. I have known not a few cases in which the printer owned the building his plant occupied, and, because he paid no rent, did not figure its rental value as a part of his cost of production. When interest, depreciation and similar expense items are not included with the other expenses of the business, the plant can be operated under low prices for many years; but, unless new capital is added from time to time, eventually it will be forced to the wall, because with its antiquated equipment, it can no longer compete with modern shops, and has neither

cash nor credit with which to replace worn-out and obsolete machinery and material. When the inevitable failure comes there is an immense loss which is mostly paid by those who pay their bills.

Do you, dear reader, know the cost of an hour of time in any one of the departments of your plant? Can you on your word of honor, give me the exact cost of an hour's time and back up your statement with proof that will be accepted in a court of law? Unless you can answer "yes" to these questions you do not know the correct price of a job of printing even tho it has been produced in your plant. Unless you can answer "yes," you are losing money every minute you delay the installation of the standard cost system.

Can you with all your experience estimate within twenty per cent of the actual time a given job of printing will require? In figuring on printing do you first estimate the amount of time each operation will require, and then multiply the time items by known hour costs, or do you write on a piece of paper (or figure mentally), "stock, so many dollars; composition, so many dollars; presswork, so many dollars; binding, so many dollars; total, so much?" Do you regularly compare estimates made beforehand with actual results as shown by carefully kept time records? If on any part of the work your estimate varies more than twenty per cent from the actual time (it should be within ten per cent), if you do not first estimate the time and then apply known hour costs, if you fail to compare estimates with actual results, you are losing money every minute you delay the installation of the standard cost system.

"Why should every printer install the standard cost system?" Here are some of the reasons:

It will show him the exact cost of every job.

It will enable him to make a profit on the printing he sells.

It will point out the jobs (usually "regular" work) which fail to give a profit.

It will point out innumerable leaks that are unsuspected, but which nevertheless are the sources of large losses.

It will aid amazingly in the making of correct estimates.

It will largely increase the proportion of work given him without a price being asked in advance.

It will "insure" his fire insurance should he be so unfortunate as to suffer fire loss.

It will immensely increase the efficiency of his plant.

Last, but not least, it will make him a better business man, and place his business on as high a plane as that of any one in any other line.

The standard cost system will do all this and more, and the cost compared with the profits will be so small that the printer who installs and uses it will, in racing parlance, find that he has made a "hundred-to-one shot."

Mere assertion, you say? No, it is not. Hundreds of printers who, tho on the ragged edge, were saved from failure and placed in the successful class by the standard cost system, will tell you that what I say is true. They will tell you something else, too; which is, unless you will thoroly install and conscientiously use the standard cost system, discarding any home-made system you may be

6 The unconscious price cutter

using, don't put it in. Neglected, or used half-heartedly, the standard system will do little or no good. The system will not run itself any more than your books will keep themselves. But, given the attention it deserves, the standard cost system will prove to be the most important thing in your office.

When considering the question of installing the standard cost system, approach it with an unbiased mind. If you are one of those who believe most of your competitors need education in matters of cost, but that you yourself know all about them, disillusion yourself at once. If you are not using the standard system you need educating as much as any one else. This I know from experience; for previous to the time when I began the study of printing office costs I had implicit faith in my own infallibility and a supreme contempt for what I considered the ignorance of others. All I could see was the occasions on which the other fellow's price was lower than my own. It never occurred to me that by any possibility anything could be wrong—that I could with equal justice be called a price-cutter—when my price was lower than his. How our minds do broaden out thru study, travel and mixing with men!

I have no ax to grind. I am telling you what experience, observation and study have taught me. I am an impartial observer, and I want to say that never yet have I found a printer who constantly complained of the low prices made by his competitors that was not himself as bad or worse than any of them. I want you, therefore, to believe in my sincerity and honesty of purpose—aye, in my actual knowledge of conditions—when I tell you in

all candor and kindness that your own knowledge is little or no greater than that of your competitors, and that to depend upon it without the aid of the standard cost system is to lean upon a broken reed.

Altho one who is accustomed to the work can install the standard cost system more quickly and with less expense than one without experience, it is nevertheless possible for anyone with a good knowledge of the printing business, and possessing average intelligence, successfully to accomplish it. While the blanks used may be any one of several forms without at all affecting the results, provided the principles of the system are not departed from, time and money will be saved by adopting the simple forms we shall show. To get the best results all printers must use the same system, for if any other is used comparisons of results will be impossible; which would mean that, while the individual might possibly know the costs in his own plant, he could not know that his costs were as low as they should be nor that his output in a given time was up to the maximum. Besides, the standard cost system is the most accurate of any, is the simplest and easiest to use, and is the least expensive to install and maintain; all of which will be demonstrated later.

Before taking up the explanation of the principles of the standard cost system I would remind my readers that "experience is a bitter school; but fools will learn in none other, and scarce in that"—not the exact words, perhaps, but they nevertheless express the thought of that wise and successful printer, Benjamin Franklin. We can learn without resorting to the bitter school of experience if we will but do so—if we are not fools. The ex-

perience of others is quite as good as our own. Let us profit by it. Let us forget our prejudices and jealousies, and meet our brother printers in a spirit of good-fellowship, confidence and co-operation. Let us learn from them while they learn from us. And let us remember that this treatise on the standard cost system is the story of the experience of many printers.

Chapter Two

The Principles of the Standard Cost System

TO BEGIN with, I want to say that the standard cost finding system of the United Typothetae is the least complicated as well as the most accurate of printer's cost systems. Based on a few principles so clear and logical that they may be said to be self evident, it is at once so simple that the merest tyro can understand it, and so elastic that it is perfectly adapted to the needs of plants of any size, from the largest to the smallest, and also to the plant doing a special line of work. With it the transactions of any department may be subdivided and analyzed to hair-splitting nicety, if one cares to do that; or, if one prefers, the system will show as readily only the more important facts of cost-finding.

No one man can claim the credit for originating the standard cost system. It is a growth. The system is founded on the work and study of many men, the more prominent of whom are doubtless Dando of Philadelphia and Blanchard of New York. The writer, with the aid of an expert accountant, and after making a study of the work of others, some years ago devised a blank which embodied nearly all the features of our present statement of cost, about the only difference being that the cost of the sold hour was divided into two parts—

10 The principles of the standard system

the labor cost and the "overhead burden." By adding the two parts together and dividing into them the sold hours in a department, the true hour cost was obtained. The expense items taken into account were the same as those now listed.

If I mistake not, this blank, with others, was shown in *The American Printer* in 1901 or 1902. We have gained greatly in the knowledge of cost-finding since then. We will continue to learn, no doubt; but I believe future advance will be more in the nature of better methods of applying the principles rather than in changes in or additions to the principles themselves.

The principles of the standard cost system are:

1. The standard unit of product shall be the sold hour.
2. The standard hour cost shall be the cost of labor plus its share of all department and business-office expenses.
3. The standard method of caring for expenses other than labor expense shall be to charge direct to each department all items of expense originating in the department, and to distribute the business-office expense over the departments on the basis of total department expense including pay roll.
4. That stock and its handling, and also shipping shall be kept as separate departments, but that they may, if desired, be included as an item of general expense.

These are the principles. Simple, are they not? Nevertheless, it is not the easiest thing in the world to understand their application. It is unfortunate, too, that nearly all of those who understand and attempt to explain them talk entirely over the heads of their auditors, and illus-

The printer sells labor and merchandise 11

trate their remarks with blanks so complicated and so numerous that the printer goes away with little if any more knowledge than he had before, and says to himself, "That is doubtless a fine system for a big plant, but it's entirely too complicated for mine." It is the purpose of the writer to explain the standard cost system in a manner so simple that all can understand it.

The first principle declares what the unit of the product shall be. It is obvious that the printer has but two things (or classes of things) to sell. These are labor (or time) and merchandise. Of these two things labor is by far the more important, for we sell much more labor than we do stock, and it is much harder to learn the cost of labor. No argument is necessary to prove that the things sold must pay all the expenses of the business, and, in addition, provide a profit.

There are two kinds of time: productive and non-productive. Productive time is the time we sell. It is productive because it produces a revenue.

Non-productive time is the time we pay our work-people for, but which we do not sell. It produces no revenue.

It is self evident that the hours we sell (productive time) must bring a price sufficiently high to take care of the cost of the hours we do not sell (non-productive time), as well as of the cost in a department other than wages, and of such part of the business-office cost as the department is responsible for. Now inasmuch as the hours we sell *must* provide the revenue to pay all these costs or expenses, it follows that "the unit of product" not only shall be, but in the nature of things *must* be, the sold

hour. We sell time divided into hours; certain expenses are engendered in preparing this time for the market; the selling price of the time must pay all the expenses and return a profit besides. In short, we do with the time we sell just what the merchant does with the goods he sells. Our first and basic principle, therefore, is proven to be absolutely correct.

Our second principle explains itself. It is really a part of the first principle, for it merely states the obvious fact that the sold hour shall be marketed at a price sufficiently high to pay the entire cost of the hour.

Principle No. 3 is questioned by some. Those who question it maintain that certain of the expenses of doing business are created equally by all the productive hours, and that, therefore, in so far as these expenses are concerned, the same amount should be added to each sold hour to cover them. It is claimed that supervision, for instance, is as necessary in one department as in another, and that to cover it the low-priced bindery labor should have added to it the same amount per hour that is added to the high-priced press hour. Assuming that the total of such expenses is twenty cents per hour for each sold hour in the plant, and that the total of all other costs amounts to twenty cents per hour for girls' work in the bindery, and to one dollar and fifty cents per hour for a cylinder press, those who question the correctness of our third principle would have us add twenty cents to each hour of girls' time, making it cost forty cents an hour, and also twenty cents to each hour of press time, making it cost one dollar and seventy cents an hour. The reasoning of those who assail principle three is faulty because:

1. The same degree of supervision is *not* required for the low-grade work.

2. To say that each productive hour should carry an equal share of certain expenses is equivalent to saying that an express company should charge the same rate for transporting a dollar watch from New York to Boston that it would charge for carrying a diamond-studded time-piece from the former to the latter city. To state the proposition is to show its absurdity.

Our third principle is correct. Managers, superintendents, salesmen, foremen—the entire business organization in fact—devote most of their time to the higher-priced labor. The expenses of administration are in large measure due to the necessity for careful planning and unceasing watchfulness over the work of compositors, stonemen, typesetting-machine operators, pressmen, rulers, finishers, and other high-priced work people, and the cost of management and supervision declines as the grade of work and the wages paid for it become lower. The most that could be said is that such an expense as that for an electric light would be the same for a six-dollar girl as for a twenty-four-dollar man. This is quite true; but the difference in the hour rate that would be brought about by charging the cost of the light direct to the cost of the hour of the individual instead of taking the cost of lighting the department and finding the cost of it per hour for all the sold hours in a sub-department, would be so small that it could not be found with a microscope. It is easy enough to find the cost of the light used for the sold hours of the individual workman; but to find it will cost several times as much as to find it for the department,

14 The cost of stock handling

and when it is found for the individual we have spent a lot of time and money for nothing.

The standard cost system is not a lot of useless red tape, tho the lover of tape can go as far as he likes. The writer is opposed to the spending of time that costs five cents to save the loss of a penny. We can very well leave to the government the writing of a check and a letter, the addressing of an envelop, and the payment of the cost of stationery and postage, in paying an indebtedness of one cent.

Our third principle is correct. It is founded on common sense. It distributes the cost of doing business thru-out the departments in a fair and impartial manner, and gives to each sold hour its rightful share.

Principle 4 relates entirely to the selling of merchandise, except in so far as it includes the delivery of the printer's finished product. Personally I favor adding the cost of handling paper stock to the original cost of the stock, the total being the true cost. In the very small plant, however, the results will be the same, to all intents and purposes, if the cost of stock handling and shipping are added to the office or general expense items.

Except in plants large enough to warrant the employment of a stock-man, the exact cost of stock handling can not be accurately ascertained except at a cost much greater than the value of the information. This is because the stock is looked after or cared for by every one having a moment's time to spare when the occasion for caring for it arises. A pressman will receive, unwrap, pile or put away, and cut stock, doing most of the work at odd moments while his presses are running. Bindery

workers may do the same thing. Much of the time so spent is divided up into periods too short to make its recording worth while, and for that reason a good part of it is lost, with the result that the records show a lower stock-handling cost than actually exists. The loss, however, is not important. No loss is important when the cost of stopping it is greater than the loss.

Then, too, we have pretty accurate knowledge of the cost of stock handling. The recommendation of the United Typothetæ of America that at least ten per cent be added to the first cost of stock to cover the cost of handling is very good, and should be followed by all plants which do not have actual records. In the opinion of the writer, however, ten per cent is too low. A large paper-jobbing concern, well known to the writer, which operates a very complete cost system, finds its cost of handling to be about twelve per cent; it is hardly probable that the printer, handling smaller lots, can reduce his stock-handling expense to a figure much below this.

When representative bodies of men, after careful consideration and exhaustive trial under all sorts of conditions, take the position that certain principles are correct, those principles become standard. Several international cost congresses have declared the principles of the standard cost system to be correct. The United Typothetæ indorsed the principles. A large number of sectional and state congresses have taken the same action. There has been no instance of a representative body of printers declaring otherwise, to the best of my knowledge.

There can be no argument, therefore, over our claim that there is but one cost system based on correct princi-

ples, and that is the standard cost system. Mere individual opinion can not be considered in matters such as this.

Now that we have shown the necessity for the use of the standard cost system in every plant, and demonstrated that the principles on which it is founded are correct, we will proceed to a discussion of the application of the principles and show forms which, while simple and easily understood, will give complete information concerning the cost of production. We will also show certain other forms, some of them having nothing whatever to do with cost accounting, but all of them essential to the efficient management of a printing plant.

Chapter Three

Application of Principles, and the Inventory

THE very largest plant need use but four actual cost blanks. In plants of medium size three will suffice. In very small plants two are ample. This is because nearly all the forms shown by the writer, or by any one else for that matter, are not cost blanks at all. They are, however, used in connection with the cost blanks, and might, perhaps, be called auxiliary blanks. (They are record blanks, and are already used, in one form or another, by every printer.) All printers, for instance, use some sort of job instructor, even tho it may be nothing more than a notation on the copy itself. The same is true of the job record, the time-ticket, the inventory sheet, and so on. Such blanks, however, should be systematized and standardized, so that they may be used with the true cost blanks with the least possible trouble.

For purposes of cost finding an inventory is not necessary. But we must know the amount of money invested in each department of the plant. Few plant inventories show the investment in each department; indeed, the majority of plants are not inventoried at all. Therefore, before we can ascertain the hour costs in the average printing plant, we must take an inventory of the equipment by departments so that we may know how much

18 What the inventory should show

money we have invested in each. Inasmuch as we must take an inventory anyway, in most instances, let us do the work thoroly, and in a way that will be of the greatest possible value to the owners of the plant.

It is not the purpose of an equipment inventory to show the present net worth of a plant. What it should show is, the list price of every article in the plant which is a part of its permanent equipment. (Permanent equipment might be defined as articles having a life of four or more years. Things with a shorter life had best be considered items of department expense.) To carry printing material at the list price is the common-sense plan; under any other the printer is likely to suffer. In case of a fire the insurance companies can be depended upon to fix the loss at as low a figure as possible, and that is all the printer can expect. He would be foolish, therefore, so to plan his inventory that it would show a smaller plant value than the true worth. Yet that is just what it would do, in many cases, were net instead of list prices shown in the inventory.

In explanation of the above we will compare a fire-loss settlement made on the basis of two inventory values, one with prices carried at the list and the other at the net.

The general trend of prices is upward. There are, however, periods of comparatively low prices. As is well known, the price of type was much lower in January, recently, than in July of the same year. An outfit of type the list price of which was ten thousand dollars, could have been purchased in January of that year for less than five thousand dollars, as the founders' discounts exceeded fifty per cent. Printer A purchased such an

EQUIPMENT INVENTORY

Description			
Date bought	From		
Remarks			
	List price	\$	
	Frt and installation		
	Total	\$	
Date disposed of			
Disposition			
	Proceeds	\$	

An inventory card
Each card, five by three inches in size, contains but a single item

outfit, and, as it cost him, installed in his plant, say five thousand dollars, he carried it at this figure in his inventory. In July his plant was destroyed by fire. To prove his loss he exhibited his inventory to the insurance adjusters, who took it without question and paid him five thousand dollars for the loss of his type. Was he entitled to a larger sum?

During the same month of January printer B also purchased an outfit of type costing ten thousand dollars. Being wise in his generation, he entered each item on his inventory at the full list price, his inventory therefore showing the gross price instead of the net. His plant, too, was totally destroyed by fire in July of the same year. Like printer A, he submitted his inventory to the adjusters. To what amount was he entitled in settlement? The adjusters gave him eight thousand dollars—just three thousand dollars more than they awarded printer A.

Now why should more be paid in one case than in the other? Simply because printer A had set a lower value on his equipment than it was worth. Inasmuch as his own books showed that he considered the material worth but five thousand dollars, that amount is all he could expect the insurance companies to pay, and all any court would compel them to pay. It would certainly be unreasonable to demand more than he himself set as the value of the property destroyed. Nevertheless, had printer A taken the proper course, instead of falling into the common error of showing net instead of gross plant value in his inventory, he would have received a larger sum.

Printer B inventoried the equipment at its gross cost, well knowing that in case of fire he would only be paid

his actual loss. He realized the fact that the value of his material should be determined at the time of the loss, and that one of the chief purposes of the inventory was to serve as a basis for determining the value. Along in March or April recently the prices of printing material advanced sharply. The old discount of fifty per cent or more from the list was withdrawn, and twenty per cent was the amount allowed. As type could not be purchased for a better price, it was worth list less twenty per cent. Now, is not the owner of the type entitled to the accretion in value brought about by market conditions? Every one is agreed that he is. To say he is not is equivalent to saying that the owner of stock in a corporation must sell his holdings at fifty per cent because he paid that for them, tho at the time of the sale the stocks were worth one hundred in the open market. Printer B, realizing the justice of the principle that an article is worth the regular market price at any given time, settles with the insurance companies on the basis of list price less current discounts, which, being twenty per cent, made his equipment worth eight thousand dollars. Had he, like printer A, carried the material on his inventory at its net cost at time of purchase, he would have been obliged to settle for five thousand dollars, for he could not collect an amount greater than the value he himself placed upon it.

What I have said merely shows why the inventory prices should be the list. The matter has nothing to do with cost-finding, but inasmuch as in nine cases out of ten a plant must be inventoried before a statement of cost can be taken off, it was thought best to show an inventory blank and explain its uses. As soon as the plant

The standard price as a basis 21

is inventoried, an investment account should be opened in the ledger, showing the actual investment in the business office and in each of the mechanical departments. This account is the basis of our charges for interest, insurance and depreciation, so far as cost accounting is concerned; for, no matter how wide the fluctuations in the actual value of the plant on account of changes in the market prices of printing material, the true money investment is shown by the equipment account. We can not, of course, change our basis of figuring interest and depreciation for cost-accounting purposes merely because the plant thru changes in market prices suddenly becomes much more valuable, or as suddenly loses a large part of its former value; nor would it be right to do so. Costs are and must be based on the actual investment if the equipment is purchased at market prices, and, in case a part or all of the plant was purchased at a figure below the market rate thru some stroke of good fortune, the standard price should be the basis any way. That this is true a moment's reflection will show. If I by chance find a ten-dollar bill on the sidewalk, it is as truly worth ten dollars as tho I worked for it, and will buy just as much. A case that once came to my notice was one in which a large amount of new wood type was purchased for less than ten dollars. There had been a railroad wreck and a shipment of wood type was scattered along the right-of-way. The wreckers thought the type was some sort of new-fangled building-blocks, and gathered it up and placed it in barrels. Later it was sold at auction by the railroad, a printer purchasing it who accidentally heard a railway employee speak of a large

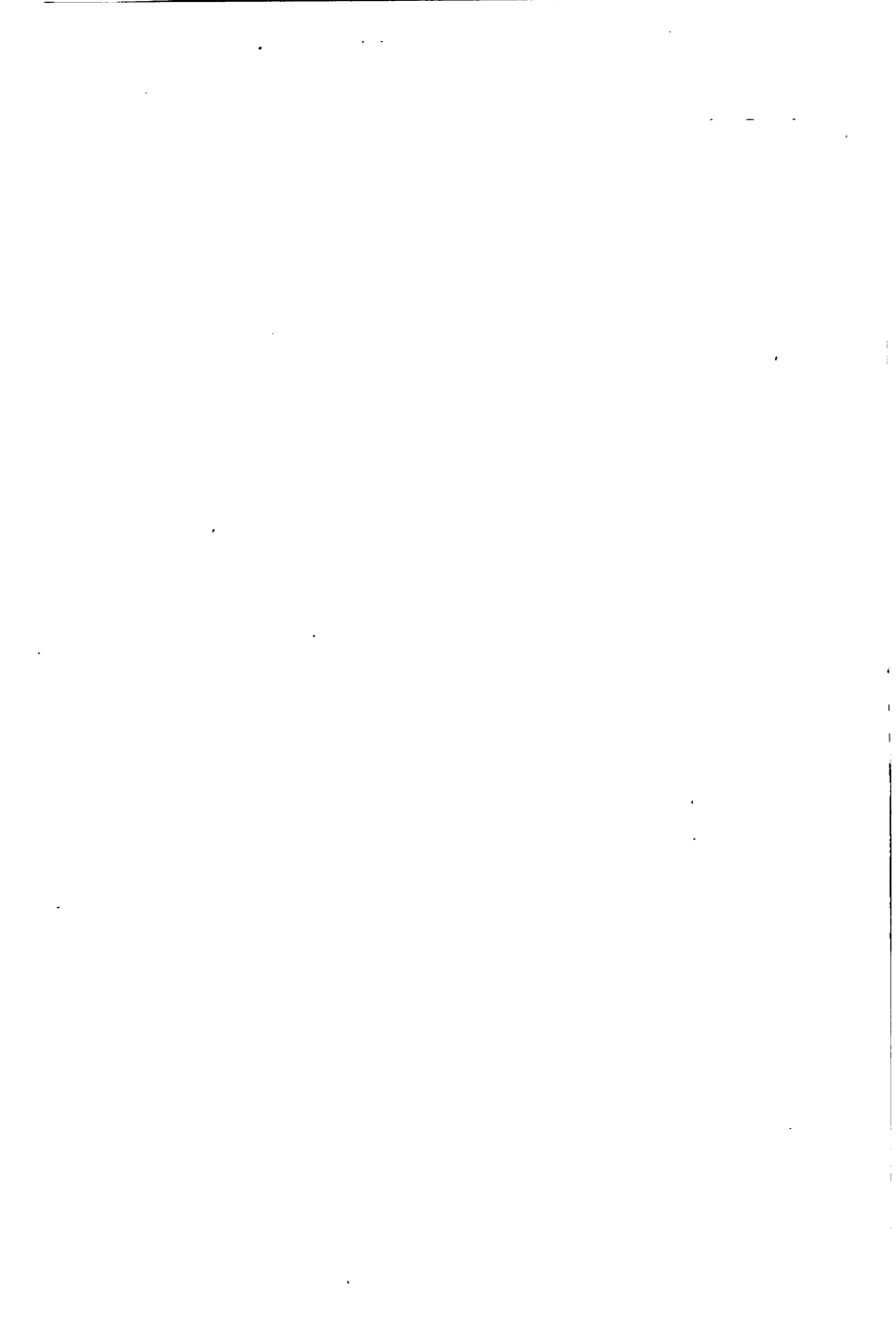
22 Two forms of inventory blank

lot of queer kind of building-blocks, with letters on one side, which would be sold. He said that even the letters were queer, as some of them were made backward. The printer bought the type. The pied fonts were separated and sorted up at an expense of less than a hundred dollars. A few years later the plant was destroyed by fire, and insurance to the amount of eight hundred dollars was paid on the wood type purchased from the railroad. The printer had merely followed the common-sense plan of carrying the type on his inventory at its market value instead of at the nominal price at which he bought it.

I show two forms of inventory blank. One is a sheet $11 \times 8\frac{1}{2}$, to be used in a loose-leaf binder. Each sheet may contain a number of items. Personally I prefer the smaller form, which is to be printed on a five-by-three index card. Each card will contain but a single item. In a plant without an inventory the large sheet may be used for listing the items of equipment, the information being later transferred to the cards. Or, if one prefers, the large sheets may be used permanently. Once an inventory is taken, additions to the plant are of course entered upon it as new material is purchased.

This form of inventory has been tested by fires in a number of plants. In addition it was recently submitted for criticism to the Alexander Hamilton Institute, of New York City, one of the leading institutions of the country for the dissemination of knowledge of the fundamental principles of finance, accounting, and business law. This prominent school not only approves the inventory form, but fully indorses my contention that the equipment inventory should show the gross and not the net cost.

[illegible]



Chapter Four

The Job Record

MY EXPERIENCE with printers all over the country proves to me that as a class they are more intelligent than the average business man in other lines. They have a clearer insight into almost every large question, taking them as a class, than the general run of people. I have come to this conclusion after having been associated with representative men engaged in many lines of industry. I am convinced, therefore, that the great majority of printers will sooner or later see the imperative need for reform in their business methods.

I have not as yet found a printer who uses neither a job record nor a job instructor. The crudest form of record I have so far seen is a sample of the completed job hung on a hook. At the end of the month all the jobs the workmen don't forget to hang on the hook are taken off and bills made out for them. The prices, of course, are merely guessed at. However, the man who follows this crude method assures me that he knows just what each job costs him and the profit he makes on it. He is sincere in his belief, too. But one of these days I am going to convince him that the standard cost system is a necessity. In fact, I can already see signs of weakening on his part, for he told me the other day that he had

24 The job record and job instructor

been in business a good many years, but that he was worth but little if any more than when he started. He is thinking about his business. When a man is induced to think it is generally possible to do something with him. As yet, however, he is afraid of what he calls "red tape."

Some printers use the same blank as job-record and job-instructor. Others use a book for the record, entering into it more or less complete details of the work, and using a printed blank or envelop for the instructor. Still others use the copy itself for the instructor, supplementing it with sundry verbal directions, and for the record adopt the simple expedient outlined above. The instructor will be described later.

My own plan is to use a printed loose-leaf form for the record, and a printed envelop for the instructor. I make the record $8\frac{1}{2} \times 14$, and prefer a single sheet because sheets are flexible in that as many as necessary can be used, while books are not. The copy itself can be used only where very little attention is paid to the instructions and none at all to recording time.

When a job comes in, the first thing to do is to fill out the job-record. From what has been said above it will be seen that the record is not, strictly speaking, a cost blank. Instead, it is a blank on which previously determined costs are applied to the job in hand. It might be called a supplemental cost blank, for while it has nothing to do with the work of determining the hour-costs in the plant, it shows, when such hour-costs are applied to the time recorded on it, the cost of the job on which the time was used, and shows this cost both by departments and as a whole.

There is a wide difference of opinion as to just how far we should go in keeping the cost records and the blanks supplemental thereto. The further we go the more truth there is, of course, in the statement that cost accounting is a system of red tape. I believe in stopping far short of the line where the cost of securing the information is greater than its value. For this reason I have done away with the practice of entering the names of the workmen on the job-record. The names serve no good purpose. They merely complicate the work of cost-keeping and increase the time necessary for filling out the blank. If for any reason it is desirable to know who did the work, the daily time-tickets will furnish the information.

The method of using the job-record is easily understood. The face contains a general description of the job, together with the name of the salesman and the time of delivery. The items, composition, presswork, binding and the like, are partly filled in after the work is completed, and partly before. It is impossible to fill them all in before the work is done, because so many unforeseen contingencies arise. The *total* time required for the various operations can of course be entered only after the completion of the work, tho as the work progresses the time spent on it each day is entered and itemized on the back of the record. On the back, also, the job number, the name of the customer, and the time of delivery, are repeated. Inasmuch as the time is entered daily, the back of the record becomes a record of the progress of the job, informing the management of its progress thru the house and calling attention to delays almost as soon as they occur. It is, in fact, a constant reminder,

26 Productive and non-productive time

and automatically takes the place of a "tickler" while eliminating all the work the keeping of a tickler involves. The reader will note that provision is made for a memorandum of the date and hour on which each job is to enter the several departments. The entries of time in each department show whether or not the job is coming thru on time. That this important matter is taken care of without adding a moment to the time the cost-clerk must spend in taking care of the blanks, is a valuable detail not found in any other set of forms.

Both sides of the blank are shown. It will be observed that there is no heading over any set of columns on the back of the form. The idea is to write in the name of the department or sub-department in which the work was done.

In both composing-room and press-room, and to same extent in the bindery, more or less non-productive time chargeable to the individual job is unavoidable. For instance, if the instructions are to set the lines the long way of the sheet, and thru an error they are set the short way, the work must be reset. Of course, the resetting can not be charged for. It is non-productive time, and, while it becomes a part of the general non-productive time of the department, it must also be specifically charged against the job on which the error occurred. In order that there may be neither extra work nor loss of time in separating the productive and non-productive time items, I begin the entries of productive time at the tops of columns, and the non-productive at the bottoms. By this simple plan much work is saved.

One of the greatest benefits of the standard cost sys-

Make-up

Ship or deliver _____
at _____

[illegible]

thru on time

JOB RECORD OF COST

Job No. 1483

Received May 1, 1913

Promised _____

Sold by Shaw To Pittsburgh Colliery Co. & Coal Co.

Description 3500 Pop Vickets 14x2

Cost

Sell

Stock

40 Shells 202 140 # White Dandy
Prior

96
10

125

Cover

*Total 106

Composition - Mch

Hand

14

tem is the increased efficiency its use invariably brings about. The greater part of the time lost in printing-plants is due to causes entirely beyond the control of the workman. In fact, the percentage of time lost thru "soldiering" is comparatively small. Most lost time comes from waiting for various things on the one hand, and from doing unnecessary work on the other. True, in any specific instance the waiting and the unnecessary work *were* unavoidable, because, conditions being unknown, *provision could not be made to correct the trouble*. Almost any set of blanks embodying the principles of the standard cost system will bring to light a few of the leaks occasioned by unnecessary work and waiting on others; but only those described here will point out practically all of them. This is true because *a leak can only be known when we know what the time was for*. An entry which merely shows that hand-composition time to the extent of ten hours was put in, gives little information of real value. We must know what the workman was doing during every minute of those ten hours; for, when we know what he was doing, we will have an explanation of why it took ten hours to do work which should easily have been done in five.

If the management does not know what occasioned the excess of time, how can the workman be blamed? The explanation heretofore given by most managers was the stereotyped one that while a job can be easily put thru in ten hours today, it may quite as reasonably be expected to take twenty hours tomorrow. Such differences are popularly supposed to prove that there is a mysterious something about the printing business which makes them

28 Why the amount of time differs

impossible of correction. This supposition is nearly as general as was the old belief that the earth was flat, and it has about as much foundation in fact. That the differences exist is true beyond dispute; but they prove, not weakness inherent in the business itself, but instead, *incompetency in the management*. Within two days of the date on which this was written I saw, in a first-class plant, the time records on two editions of a job, the second edition having been issued four years after the first, the copy for each having been reprint. The composition time was ten hours and thirty minutes in one case, and ten hours and thirty-five minutes in the other.

It is true that some men will do more work than others in a given period of time. Also, one man, because of his special experience, will do more than another on some certain kind of work. But the management that is up to date will see to it that incompetent workmen are not employed; and, in a plant with a fair-sized force, that the work is given the man who can do it best and quickest. In the small plant, where the work is ordinarily less diversified, it is quite possible to find or "break in" workmen who will do all the sorts of work given them as well and as quickly as it would be done in the large shop. Indeed, the writer has always succeeded in finding workmen for large plants who in their own departments could be given any sort of composition, or presswork, or binderywork, and who in the minimum of time would do whatever was given them as well as it could be done.

The secret of quick work of high grade, after a first-class force has been selected, is, *first-class equipment*. When these two things are provided—a first-class force

Comparing job record and estimate 29

and a first-class equipment—there will be no great differences in time. But go into the average shop, and what do you find? Material poorly selected and a short supply. Work-rooms arranged in helter-skelter fashion and with neither light nor ventilation. Material so old and battered that forms can not be made to lift, nor to print when finally got on the press. Foremen and superintendents who secured their jobs thru “pulls,” and who would be much better fitted for other lines. No planning of work before it is sent to the work-rooms. These are the things inherent in the printing business which are the true explanation of the fact that a job set in ten hours today will require twenty tomorrow. Eliminate them and the differences disappear. The standard cost system will help you to eliminate them. Nay, if you are wide awake it will *force* you to do it, for it will show you your finish if you fail to heed its warning. And it does all this by simply showing the management what the time was for—and what each workman and machine was doing during every minute of the working-day.

To be sure this information is furnished by the daily time-tickets, which we will describe later. But from the time-tickets the time is posted in detail to the job-record, the blank which forms the basis of this article. The manager, or the experienced man to whom the duty is assigned, takes the job-records after the cost-clerk has entered all the time on them, and examines them, comparing them with the original estimate if one was made and making note of any time entries which could have been eliminated and which can and must be cut out on future work. An example of what he may find was shown me

30 Lost time in the composing-room

a few days ago by a manager who recently installed the standard cost system under my direction. He had just printed a dance program, set in the six-point sizes of plate gothic. The straight composition time was an even hour; in addition there was three-quarters of an hour *hunting for sorts*. Forty-five minutes, costing at least two cents each, were absolutely lost. As this amount of time should sell for at least a dollar and ten cents, this was the net value of the time lost in the composing-room on one of the smallest of jobs. Why, an entire new font of the type needed would have cost no more, and had the extra font been in the case there is no telling how much time it would have saved, for cost records had not previously been kept. And yet we wonder why printers so seldom make money!

In the composing-room lost time is mainly due to wrong instructions; incomplete instructions; no instructions at all; shortage of type, leads, rules, slugs, quads, furniture; the use of "skyscraper" cabinets, which save cheap floor-space at the expense of high-priced labor; weak and faulty chases; poor light; no ventilation; improper arrangement of equipment; lack of storage facilities; lack of stone room; lack of system in caring for jobs while proofs are out; lack of system in caring for plates; lack of systematic planning of work before it is given out; and many other things which will occur to the reader. The job-record, thru the information gathered by the other blanks of the system, will point out practically all these things, and the few that it fails to specifically bring to light will be brought to the attention of the management through the investigations of the others.

Lost time in press-room and bindery 31

In the press-room the time is mostly lost thru extra make-ready necessitated by worn-out printing surfaces; waits for stock, for ink, for the O. K., for the feeder; lifting forms; poor rollers; work-ups; material pulling out of forms; changes in temperature and humidity, which may or may not be beyond control of the management; improperly balanced working forces; poor arrangement of the equipment; presses of too many varying sizes and makes; washing and oiling machines during regular work hours; and many other things which the experience of the printer will suggest. The standard cost system will point them out, and the manager will find them noted on the job-record.

There is less lost time in the bindery than in the other departments. Nearly all the loss is due to "soldiering," and the rest of it mostly to carelessness, tho of course unavoidable mistakes will sometimes occur. The standard cost system provides the means for keeping a strict account of the output of each bindery operative, and our job-record will show whether or not the work was done in a reasonable amount of time. As it also shows the errors that were unavoidable and those due to carelessness, all "soldiering" will be pointed out and those responsible for it will be known. The remedy is obvious.

A known leak can be stopped. The standard cost system points out the leaks, bringing them to the attention of the management thru the medium of the job-record, I have never known of an instance in which the use of the standard cost system did not increase the efficiency of the plant *more than ten per cent*. The cost of operating the standard cost system will not be one per cent of the

The face of the job record

cost of your output. Increased efficiency is only one of the benefits; but from that standpoint alone you will be at least ten per cent better off at the end of the first year by reason of your use of the standard cost system than you will be if you do not install and conscientiously use it.

The face of the job-record is shown filled out. On the back, at the left, is space wherein a memorandum of the routing is made. The time entries will show whether or not the job is coming thru on time. In the column headed "date," insert the date on which the work was done; under "kind" insert the number designating the kind of work; under "hours" the hours and tenths of hours the workmen spend on the work. The blank is $8\frac{1}{2} \times 14$, with binding space at the top. On the back, too, the job number, customer's name, and delivery date, are shown.

Chapter Five

The Job Instructor, and the Stock Ticket

BY COST-FINDING we mean, first, finding the cost of the sold hour, and, second, finding the cost of the individual job by departments and as a whole.

When we do these things we also provide ourselves with data which shows us the cost of operating the plant by departments and as a whole.

As yet we have shown no blanks which can properly be called cost-finding forms; nor will any be shown in this article. The forms thus far reproduced are improved varieties of forms used by every printer. While most of them are used in connection with the true cost-system blanks, the job instructor and the stock ticket are not. They are described here merely because they are important adjuncts to the economical operation of a printing plant. For such operation a number of blank forms in addition to the cost blanks are necessary, and it is the belief of the writer that they should be shown along with those used exclusively for cost-finding.

The job instructor, as its name indicates, is a blank on which is written out all instructions to the workmen. My form also serves as a "tickler," for it includes directions regarding the date on which the work of each department must be finished and when the job must be shipped or delivered.

The work coming to the printer should be planned before it is sent to the work-rooms. Some one must plan every job, except, of course, the strictly reprint reorders of small work. An immense amount of time will be saved if this planning, which includes the making of a time allowance for each operation, is done in the office, or at least by some one other than the workman to whom the job is given. I am aware of the fact that in very few offices is there any planning of work before the job is started thru the plant, and that in next to none is a time limit set on the various operations. Nevertheless, these things should be done. The doing of them increases the profits of the plant; and profits, I take it, are the inducement which keeps us in business.

The printer who makes the highest price is not always the one who earns the largest profit. Economy of production is quite as important as high prices, and, because of superior management, one printer will make a good profit at a price which would mean a loss to another. Better management—scientific management if you please—is urgently needed in most printing plants.

Right here is one place in which the standard cost system helps wonderfully. The plant using the system finds itself possessed of three-fourths of all there is in scientific management, in so far as that system of management is applicable to a printing plant. By adding the two items of time allowance and planning to what the standard system gives, we have the other quarter. True, scientific management will not do for the printing concern what it will do for the manufactory making the same article over and over again, nor yet what it will do for the

industry—brick-laying, for example—in which the workman does one thing (or at most a very few things) all the time. But in the more mechanical processes, such as running presses and operating typesetting machines, it will do a great deal.

Both the planning of the work and the making of a time allowance for it require study and experience. To plan successfully one must be an artist and must be familiar with the best of past and of present-day printing. He must study the type founders' specimens, haunt the art galleries, and must religiously read the trade papers, to the end that he may learn from the experience of others and keep in touch with the ideas of contemporaries.

To be able to decide in advance the amount of time the various operations on a given job will require, one must have practical experience and be possessed of an analytical mind. Reasoning power, common sense and experience are the three necessities. All the knowledge of the successful planner, too, is essential. In fact, planning and timing go hand in hand, and the mental equipment requisite for each should be possessed by one person.

To illustrate my meaning, let us take the planning and timing of the imposition and lock-up of a simple sixteen-page form, six by nine. Many will say that no question of art is involved in this simple problem; but there is. First, the width and depth of the type-page; next, its position on the leaf; these are matters of great moment from the standpoint of art. The size and style of the type-face are important, too; but to illustrate our point we need consider only the position of the type-page

on the leaf, and how a diagram showing the correct position affects the lock-up time. In determining the correct position we must take into account the measure and the depth of the page. The approximate number of pages being known, we find by a simple calculation that a type-page twenty-four by forty-one picas of the face selected will just fill the space at our disposal. The first question to be decided is, is twenty-four by forty-one picas a symmetrical size? The rules of art tell us that to be of perfect symmetry the type-page must be of a height sufficient so that the distance from the upper left-hand corner to the lower right will be just twice its width. A page twenty-four by forty-one picas does not quite meet these requirements. It is about a pica too short. However, so slight a variation is hardly noticeable, and a type-page of the size indicated will present a very pleasing appearance when correctly positioned on a six-by-nine-inch leaf. A twenty-four by forty-one type-page, too, covers a goodly proportion of the surface of a six-by-nine leaf. If one cares to make the calculation he will find that the margins comprise nine hundred and fifty-seven square picas and the type-page nine hundred and eighty-four square picas of the surface. While it is true that the marginal space could be considerably increased and the type-page made smaller without detracting at all from the beauty of the whole, little or no criticism can be made against our size of twenty-four by forty-one picas.

Now that we have decided on the type-page size, our next problem is the size of each margin. When a book is opened, the two back margins of the opposite leaves are together, so that we have more white space at the

The proportion of the margins 37

back than anywhere else. But the fold of the sheet, or the nearest point to the fold the eye can reach, makes a break in the expanse of white sufficiently prominent so that the area does not appear to be excessive, provided the type matter is correctly positioned, tho if incorrectly placed the effect is anything except pleasing. We must, therefore, assign a smaller marginal space to the back than to the front margin. As our type-page is twenty-four picas wide, or four inches, we have two inches (twelve picas) of space that we must devote to the front and back margins of the six-inch leaf. As the back must be the narrower of the two margins, we naturally assign five picas to it, as the pamphlet, being saddle-stitched, opens clear back to the fold. If five picas are given the back margin, there will of course be seven in front.

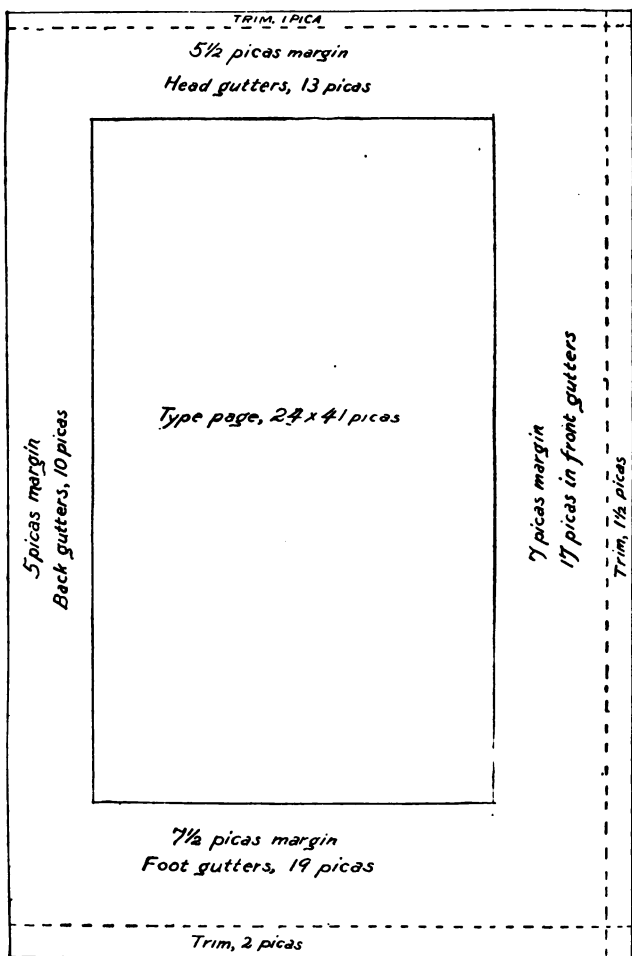
The head margin must never be less than the back. It can be exactly the same as the back, but should, if possible, be a trifle wider, and it must be perceptibly narrower than the front. On the page we are describing we will make our head margin slightly wider than the back—five and a half picas. The type-page being forty-one picas deep, there remain seven and a half picas for the foot margin. We started with the back margin, the smallest of the four, and, going around to the right, increased the width of each succeeding margin—five, five and a half, seven, and seven and a half picas respectively. In deciding on the margins we have accomplished more than merely to assign to each its width; we have at the same time done all the planning the stoneman is ordinarily called upon to do, and to do which usually requires as much time as the work of imposing and locking the form.

As our book is six by nine, the stock must be twenty-five by thirty-eight, which folded gives an untrimmed page $6\frac{1}{4} \times 9\frac{1}{2}$. There is a trim at top, front, and foot, of course. The trim at the top we will make one pica, that at the front a pica and a half, that at the bottom, two picas.

To show the stoneman what we want we make a pencil diagram of the page, and inclose it in the job instructor. When the work reaches the stoneman the diagram shows him at once just what size the margins are to be and the amount of spacing material he must place between the pages to secure that width of margin and at the same time allow sufficient trimming room. There are, say, four forms of the work, and the one who plans it, after spending a few minutes in making a diagram similar to the one shown herewith, writes in the "time-allowance" space on the job instructor, "imposition and lock, five hours."

Five hours is a very short time for the imposition and locking of four sixteen-page forms. Yet the work can readily be done in that time, including the clearing away, if about ten minutes' time is devoted to planning it by a competent man. Furthermore, the diagram made for the stoneman also serves as a guide to the one who trims the booklet, saving him time and insuring accurate work. Without the planning and diagram we would find that the imposition and lock-up time would amount to about nine hours. It pays to plan jobs.

Another blank is the stock-ticket. It goes to the stockman as soon as the job is sent to the work-rooms. But the stock is not cut until it is known that there will be no change made in it, tho the stockman takes the pre-



Pencil diagram for stoneman

This shows size of page, margins and trim,
and is enclosed in job-instructor envelop

40 The paper should be on hand

caution to see that the paper is on hand. Changes in quantity, weight, size, quality, or color, are so frequently made by the customer that it is dangerous to cut the stock for a job before the final O.K. is received from him. Nevertheless, the stockman must see to it that the paper is on hand, for one of the most prolific sources of loss and delay in the press-room is waiting for stock. I have known innumerable instances in which a shortage of stock, and even the entire lack of it, was not discovered until the job was on the press ready to run. Under such circumstances presses must stand of course, and the loss falls on the office. There is no excuse for this sort of inefficiency, and were such standing-time known to the management it would be cut out at once. But it is not known, for under ninety-nine out of every hundred time systems there is no provision for reporting anything of the kind. The we-have-a-cost-system-of-our-own variety of cost system never points out such leaks, and such a system is therefore little better than no cost system at all, for under it the leaks continue to eat up the profits year after year. Leaks of this sort can not exist in a plant using the standard cost system.

There are certain articles carried in stock by most printers, such as leads, slugs, and brass rule, in full-length strips, and various kinds of bindery stock. When such things are used for a specific job, the material should be charged to the job, unless, as occasionally happens, it can afterward be used on general work, in which case a part only of the charge should be against the job. The amount and kind of such special material must be noted on the back of the job instructor by the foreman of the depart-

JOB INSTRUCTOR

Job No. _____

Received _____ 191 _____

Promised _____ 191 _____

Description _____

Describe

Enter bindery stock on back.

DELIVER—SHIP—To _____

freight by express } not later than

191 at M.

SPECIAL INSTRUCTIONS _____

The job instructor. Important in the operation of a printing plant

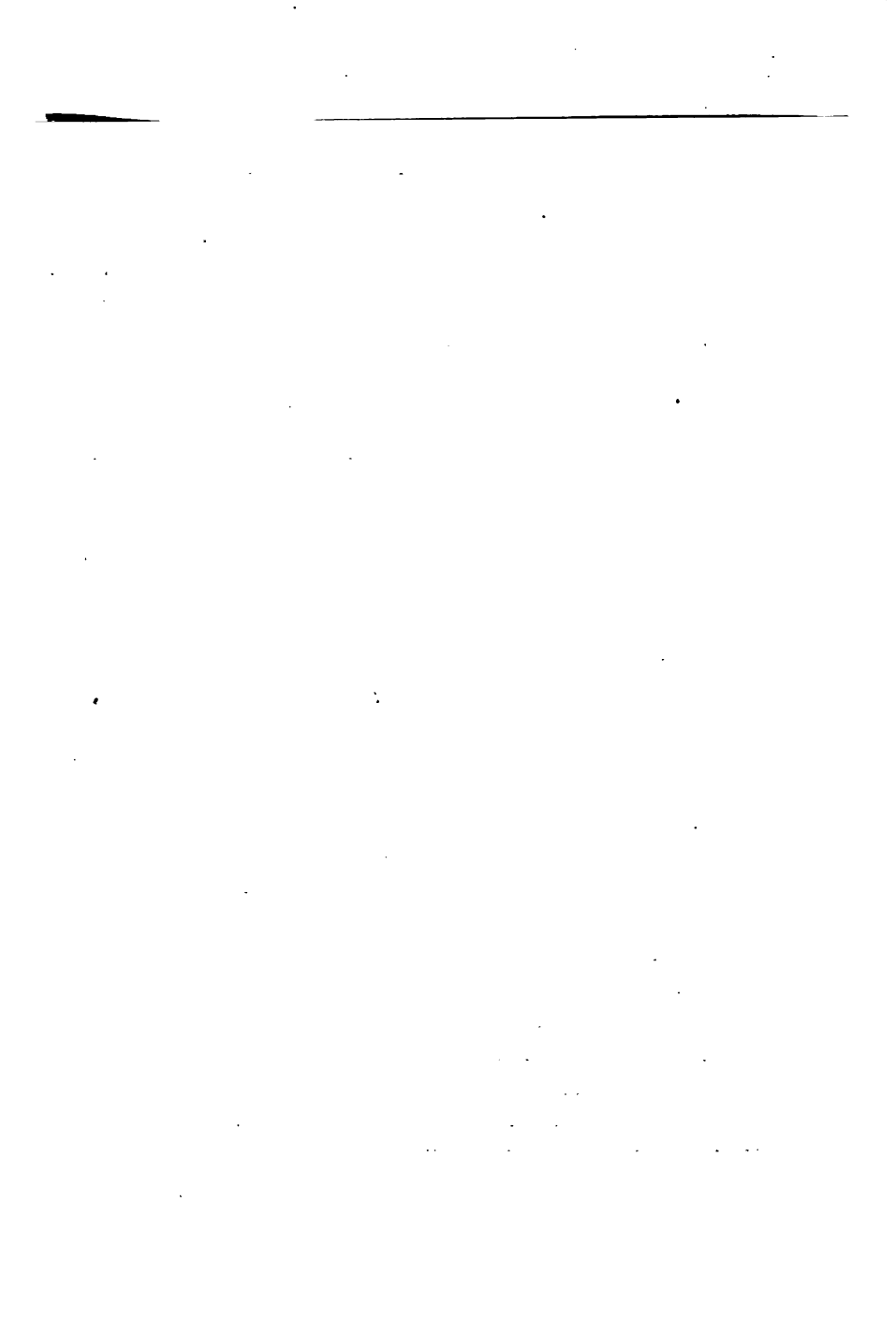
[illegible]

Special material, a part or all of the cost of which is to be charged to the job, is recorded on this form, as is also the amount of ink used

42 When special material is used

ment using it. When special material is purchased new for a job it need not be entered on the instructor, because, in that case, under a correct system of ordering, the bill for the material will carry the number of the job for which it was ordered, and its cost will be charged to the job by the book-keeper or other person whose duty it is to look after the matter.

The two blanks shown are self-explanatory. They are not cost blanks, but because of their simplicity and usefulness should be used by every printer. Beware of complicated blanks. They defeat the very purpose for which they were designed, in most cases, and invariably furnish information of questionable accuracy, while compelling those who fill them out to waste hours of valuable time.



STOCK T

Job No. _____ Date _____ 191 _____

Proof { Yes NOTE—If "no proof," cut stock at once. If proof
No cut it until notified by foreman of compos

FOR _____

DESCRIPTION _____

STOCK AND CUTTING INSTRUCTIONS _____

SIZE, WEIGHT, AND KIND _____

The stock ticket. This is a

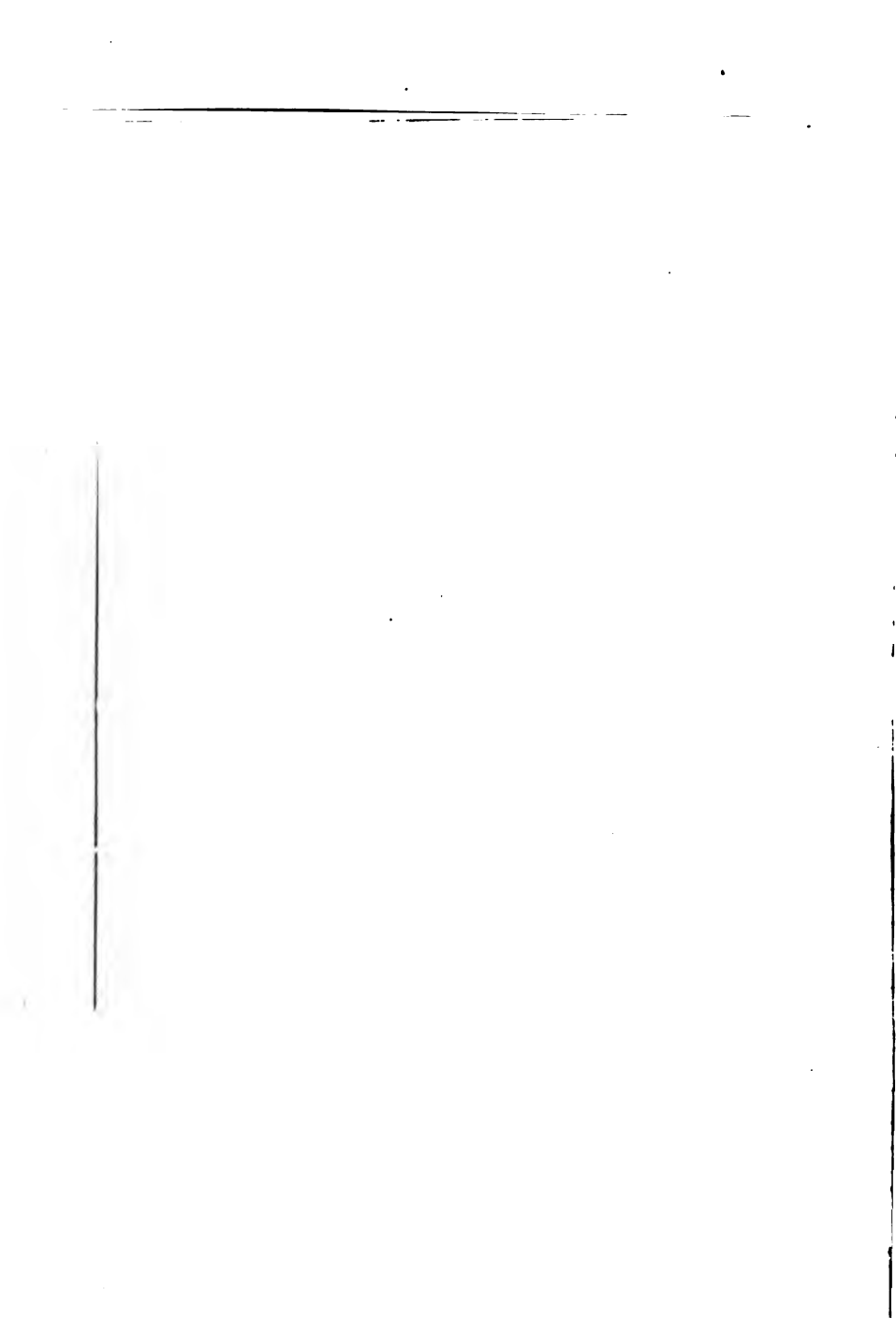
CKET

Promised _____

*f goes to customer, see that stock is on hand, but DON'T
ng-room that proof is O. K.*

	<i>Number of sheets</i>	<i>Number of reams</i>	<i>Weight</i>

nt to the stock-room



Chapter Six

Estimating, and the Estimating-Blank

OF ESTIMATES there is no end. A few are sane. Many are insane. Most of them are fearfully and wonderfully made. A man came into my office looking for a job. I asked him what kind of a job he wanted. He said he wanted the managership of a good printing office. In reply to my query as to his experience, he said he had been making estimates and managing plants for years, and that for a good part of the time he was with So & So, a concern once prominent. "But that house failed," I said. "Your connection with it is a poor recommendation, for the prices it made showed that those in authority knew nothing whatever about the cost of printing." He insisted that I was mistaken, that the house mentioned always received good prices, and that its failure was due to internal dissension. I knew better, of course, and said so. As it happened, I was making an estimate on a somewhat complicated catalog at the time of his call, and so, to find out if he really did know how to figure, I gave him the specifications and an estimate blank and told him to make an estimate on the work. He went at it, and in about an hour handed me his figures. I expected them to be faulty, but I was hardly prepared, after what he had said of his ability, for the amazing ignorance they displayed. He had less than

44 Shop ignorance of estimating

half enough stock. Linotype composition was figured at the rate of eight hundred ems an hour. Cylinder press-work he would produce at a speed of thirty-two hundred impressions per hour. I pointed these discrepancies out to him and he said he was a little rusty, as he had been doing work of another kind for some time. As he went out he said that if he failed to find a place to his liking he believed he would buy a plant of his own.

The above is not an isolated case. It has been my lot to run across many estimators who had little or no more knowledge of the work than my late visitor. In fact, I know a good many such who are making prices on printing today. But, thank goodness, they are gradually growing scarcer.

I never could understand how a man can work in a printing office all his life and still never learn a thing about the time required for the commonest kinds of work. It seems to me that every printer of experience ought to have a good idea of time requirements, and yet I know that most of them have not. Go into your composing-room and ask three or four of your best men how long it will take to set a given job. Ask your pressmen individually how much time each will want to make ready and run a given form. Ask your bindery foreman and one or two of his best men how many sheets per hour of a given job can be folded by hand. Keep a record of their replies and compare them with actual performances. If you have never tried this you will receive the surprise of your life, especially if you will also compare your own estimate with the actual time put in.

A good estimator must be possessed of sound common

sense, have highly developed powers of observation, be blessed with a retentive memory, and have an extraordinarily wide knowledge of and experience in the printing business. Few men measure up to the requirements. No correspondence course in estimating which does not furnish experience and brains will help much.

There are, however, a few simple rules which will help. In the first place, the printers' standard of measure is the pica. A pica is so nearly the sixth part of an inch that for all calculations made for estimating purposes we can call it that. With a rule or tape graduated to inches any one can easily ascertain the number of ems of any body size a page contains. It is better to use square ems than square inches, for a page always contains a certain fixed number of ems, tho it seldom does of inches. Take a page 22 x 41 picas, for example, and with a foot rule tell me how many square inches it contains. The narrow way it is $3\frac{2}{3}$ inches, the long way $6\frac{5}{6}$. The common field variety of rule is graduated to neither thirds nor sixths, for which reason the square-inch estimator must perforce approximate the dimensions in inches unless he happens to know that a pica is a sixth of an inch. If, however, he has this knowledge, he must multiply $6\frac{5}{6}$ by $3\frac{2}{3}$. He has a problem something like this:

$\frac{11}{8} \times \frac{41}{6}$ equals $\frac{451}{48}$. 451 divided by 48 equals $25\frac{1}{18}$ square inches.

Or he might reduce the dimensions to sixths, when his problem would be:

$6\frac{5}{6}$ equals $\frac{41}{6}$. $3\frac{2}{3}$ equals $\frac{22}{6}$. $\frac{41}{6} \times \frac{22}{6}$ equals $\frac{902}{36}$. In a square inch are $\frac{36}{36}$. $\frac{902}{36}$ divided $\frac{36}{36}$ equal $25\frac{1}{18}$ or $25\frac{1}{18}$ square inches.

46 Practical printers as estimators

But what will he do if he don't know that there are six picas to the inch? Why, he'll approximate it as nearly as he can with the divisions on a foot rule. Then he will look at a lot of classifications comprising various sorts of composition and decide as well as he can which one of them is the nearest to the special variety of composition in the work in hand. Not being a practical printer, he will as likely as not select a class that looks the same to him, but which in reality is radically different. He has consumed a lot of time and has accomplished next to nothing.

Were the estimator a practical printer (which all estimators should be), he would first decide as accurately as possible which of the several sizes of body-type the composition would approximate if it were display composition, tho were it straight matter or tabular work he would of course know the body size. Assuming the size to be ten point leaded, the printer would multiply each dimension of the page by twelve, as there are twelve points to the pica. The problem would be: 22×12 equals 264 points. 264 divided by 10 equals 26.4 lines or ems of ten-point type.

41×12 equals 492 points. 492 divided by 10 equals 49.2 lines or ems of ten-point type.

The rule with printers is that if the fractional part of an em is less than half it will not be counted; if it is a half or more it will be counted a full em. We have therefore 26×49 ems, which gives us 1,274 ems per page. There are, say, thirty-two pages, or a total of 40,768 ems. Now we know from what may be called our "experience tables" that a compositor on ten-point type will not set more than 600 ems per hour. So we divide 600 into

Estimating machine composition 47

40,768, which gives almost sixty-eight hours for the composition time, and the element of guesswork is as nearly eliminated as it is possible to get it.

If it is machine composition our problem is the same, except that the average output on straight matter from manuscript copy will not exceed 3,000 ems per hour. Dividing 3,000 into 40,768 gives us practically $13\frac{1}{3}$ hours—call it 14 hours for good measure.

Estimating composition on the em basis cuts out practically all the fractions inseparable from the square-inch method. The em basis is the simplest and most accurate. It is the simplest because with an ordinary inch-measure any printer can quickly and accurately determine the number of ems of any given body in a page of type. It is more accurate because it reduces the basis of calculation to ems, and every printer knows, or should know, that of six- or eight-point type a compositor will not set to exceed 600 ems per hour solid or 750 ems leaded; of the sizes larger than eight-point not to exceed 500 ems solid or 600 ems leaded; of the sizes smaller than six-point not to exceed 500 ems solid or 700 ems leaded. These figures are for average workmen on average matter. The experienced estimator will know that they are to be increased or diminished as the face is fatter or leaner than the average, and as copy is good or bad, fat or lean.

The average cost of operating a linotype machine is \$1.60 per hour. The average output is 3,200 ems per hour.

The average cost of operating a monotype machine (keyboard and caster figured as one machine) is two dollars per hour. The average output is 2,700 ems per hour.

Make-up and lock-up time depends entirely on the nature of the work. On straight work the stone-man will make up sixteen 6 x 9 pages in about two hours, and take proofs of the pages. With running heads or folio lines set on a machine, even better time will be made on exceptionally favorable matter, but more time will be consumed if the matter is interspersed with cuts or tables or is complicated in other ways. The size of the page, too, must be taken into consideration.

A stone-man will spend about three hours in locking up the first sixteen-page form of a straight-matter book, 6 x 9, and about two hours on each additional form. Eight-page forms will be locked up in about a third less time, while forms containing a greater number of pages will require proportionately more time. Forms of cuts, tables, or matter that is otherwise complicated, will take more time, as will forms of larger pages. Time will be saved by planning the work in advance, a saving of twenty-five to thirty-five per cent being easily made. (See the Job Instructor, and the Stock Ticket, in chapter five.)

The average output of platen presses smaller than 10 x 15 is 1,100 impressions per actual running hour. The 10 x 15 size, 1,000 per hour. Larger than 10 x 15, 900 per hour. The basis is hand feeding.

A cylinder press smaller than 25 x 38 will average 1,300 impressions per hour of actual running time. A 25 x 38 cylinder, 1,200 per hour. Presses larger than 25 x 38 but not larger than 38 x 50, 1,000 per hour, larger than 38 x 50, from 500 to 800 per hour, according to size of sheet and quality of stock. These are maximum figures for hand feeding, on one-color work.

Bindery-time estimates are seldom high enough. On ordinary super or machine-finished stock a girl will fold about 750 folds (not sheets) an hour. On heavy enamels and covers, not more than 500 folds an hour.

On inserting, a girl will handle from 1,000 to 1,200 sections an hour.

On interleaving, a girl will handle from 500 to 1,000 sheets an hour, according to the size of the sheet.

On gathering, a girl will handle from 1,000 to 1,500 sections an hour.

On tipping outside tips, the average operator will make from 150 to 250 tips an hour; inside tips from 50 to 150 tips an hour.

On stitching, the average operator with a helper on saddle-stitched work will produce from 20 to 30 stitches a minute; on gang work from 25 to 40 stitches a minute. On side-stitched work a girl with a helper will make from 10 to 25 stitches a minute.

On trimming and cutting, the machine in the hands of the average operator will make from 30 to 50 cuts an hour. The average height of the pile of stock in the cutter is not more than three inches.

On covering, the average workman and helper will cover from 100 to 200 books an hour. A folding-machine will fold from 1,000 to 1,500 sheets an hour, with 1,200 an hour as a fair average. This does not include the time of setting the machine. Special machines are now made which on a limited range of work will average 2,000 sheets an hour.

The above are the main points. The examination of standard-cost-system records will bring to light others

equally valuable and important. It is quite possible, too, that in the individual plant the records will not agree with the above figures, as every plant has some specialties, as well as some workmen who are experts in certain lines. Of necessity only averages can be given here.

The estimate blank reproduced has been used by the writer for a number of years. It is not a bit complicated and is large and roomy enough to permit of recording all the details. The size is 16 x 11; folded thru the center the blank makes a folder that fits into the ordinary letter file, and within it can be filed all the specifications, samples, and other things connected with the job. If the work is secured, the actual records can be compared with the estimate when it is finished, and if the order is lost the estimate serves as a permanent record should prices be asked for later, or may be referred to at any time work of a similar nature comes in for a figure.

Chapter Seven

Time-Keeping, and the Daily Time Tickets

WHILE time-keeping is the foundation of cost accounting, it is by no means the complete structure. It is a curious fact, however, that a great many printers with a more or less inefficient time-keeping system claim to have a cost system. No doubt they are honest in the belief that they have a cost system; nevertheless, they have nothing of the kind. In the majority of cases they do not even have a time system worthy of the name.

Every printing-house manager who desires to learn his costs must, first of all, disabuse his mind of any lingering belief he may have that a system of time-tickets is a cost system. A time system will not show the cost of anything. It is merely a measuring-instrument, and is used to measure time just as the dry-goods merchant uses his yard-stick in measuring cloth. The yard-stick shows the number of yards in the piece, but it shows neither the cost of the yard nor the value of the bolt. So with a time system; it shows the number of hours spent in the production of a given piece of work, but does not show the cost of an hour or the cost of the job. Nevertheless, before we can know the value of a piece of cloth or a job of printing we must know the number of yards in the one and the number of hours required for the production

52 A cost system serves two purposes

of the other. Failure to recognize the fact that while we must know the number of hours required for a given job before its cost can be ascertained that knowledge does not in itself give us any information regarding the cost, is responsible for much confusion and misunderstanding.

A cost system serves two important purposes: it shows, first, the cost per hour and the total cost of doing any given amount and kind of work; and, secondly, by pointing out leaks which would otherwise remain undiscovered, it increases the efficiency of the plant.

In the main, any increase in the efficiency of a plant is brought about thru better management. Very often, to be sure, machines may be speeded up to advantage; but it is a remarkable fact that most machines can be made to produce more without increasing their speeds at all. Workmen can seldom explain the small production of the machines in their charge; they almost invariably attribute meager output to anything except the real cause. Small output is due to many causes, most of them comparatively unimportant in themselves. In the aggregate, however, they foot up to an amazing total. Five minutes are lost here, three minutes there, and ten minutes somewhere else, and, because the loss attributable to any one item is so small, the losses generally pass unnoticed and unchallenged. Printers in general fail to realize that the cost of these lost minutes is cutting deeply into their profits. The matter would take on a different aspect if they would remember that in the composing-room the cost of a minute is at least two cents; in the press-room from one to three cents, and even more on some machines; in the bindery, from half a cent to two cents.

By lost time I do not mean the non-productive time inseparable from the production of printing. What I refer to is the time actually lost—the extra time put in on a job over and above the amount which should have been taken. It is obvious that when the fair composition time on a job is five hours, and the price is made on that basis, there is an actual loss to the printer of several dollars if ten hours are consumed in the work.

While lost time can never be wholly eliminated, a very large part of it can be. The secret of success in this matter is the use of a daily time-ticket which will show in detail precisely what each man and machine was doing during the entire workday. There was no such time-ticket known at the time of the first cost congress, which was held in Chicago in October, 1909. In 1910 the writer compiled a list of operations for use with time-tickets, and in July, 1911, on behalf of the United Typothetæ of America, he issued a booklet of "General Instructions Regarding the Use of the U. T. A. Standard Cost-Finding System" in which the operations in the several departments of a printing plant were brought down to date. The list is an invaluable part of the time-ticket, for without it it is impossible for the workman so to fill out his ticket that the management will know what he was doing during the time a given job was in his hands. There are at least forty-two operations in the hand-composition department. If no provision is made for recording them, can the workman be blamed if he fails to make mention of them on his daily report? And is any argument needed to prove that if lost time is to be eliminated, its cause must be known?

54 Tickets for various departments

I have used daily time-tickets for more than twenty-five years. They were of many kinds. The one here shown I believe to be the most perfect of them all, for its use requires less of the time of the workman than any other, the cost clerk will figure up and post the entries from it more quickly than with any other form, and the likelihood of error is reduced to the minimum.

In a plant employing ten or more work-people a separate time-ticket for each department is the best plan. In even the smallest shops separate tickets may be used as well as not; but most managers of very small plants prefer a combination ticket. The result will be the same in either case. We will first consider the department time-tickets.

The differences between the tickets for the several departments are the obvious ones that will occur to all, for which reason we will show the composing-room form only. However, the list of operations for each department is given, together with comments which explain the use of the ticket.

The daily time-tickets are eight by eleven inches. The composing-room ticket is shown in full, with the exception of the list of work items or operations, which will be found listed with those of the other departments. The operations are placed on the face of the ticket, below the part arranged for the recording of time. The six-minute unit of time is used because it is a short enough period for all practical purposes, and because, being a tenth of an hour, the figures the workman or cost clerk places in the chargeable and non-chargeable columns may be added together with practically no likelihood of error.

COMPOSING-ROOM DAILY TIME-TICKET

HAND WORK

No one is permitted to distribute or clean up except on foreman's order.

NOTE—If make-up or ad. composition is to pages worked on, if lock lock-up, give signature number.

Each employee must make out a time-ticket.

If there is a Six-Minute Period when you are not working, say so on the Ticket. We want the Actual Time on the Job.

NAME.....

.....191.....

Date.....

Clock No.....

M. C. II

TIME I

I

JOB NO. AND NAME

MARK I

CHBLE I

M. C.



The ticket is used by merely drawing a pencil line over the figures showing the time. The second job starts at the moment the first is finished; there must be no lost time between. The work starts, we will say, at 8 A.M., which is the tenth unit of time shown. A line is drawn over 8 A.M., extending across the four blank columns. The work continues until 11.18, when another job or kind of work is begun, which is shown by drawing another line across the four blank columns over 11.18. To find the elapsed time we merely subtract ten, the number of the starting unit of the first job, from forty-three, the number of the unit starting the second operation. This simple mental calculation leaves us thirty-three ($43 - 10 = 33$) units of time consumed. We point off one decimal place and find that we have 3.3 hours of time accounted for, or three hours and eighteen minutes. Could anything be simpler?

The workman, in addition to drawing the lines, writes the number of the job and the name of the customer in the column headed "job number and name," while in the column headed "work" he writes the number of the operation. Suppose the entries are, "4,322; Evans & Co.; 21;" and that the lines showing the starting and stopping time are placed as mentioned above. In that case the ticket would show that job No. 4,322 was for Evans & Co.; that the work was hand composition, and that the time spent on it was three and three-tenths hours. The work having been hand composition, it is productive (or chargeable) time.

The entire ticket is filled out in this manner, the workman making an entry each time he changes from

56 Entering the time on the job records

one kind of work to another and each time he starts a new job. It is imperative that the entries be made at the exact time the work begins or ends. At the close of the day the time-ticket is handed to the foreman, who examines it and turns it over to the cost clerk. The cost clerk first computes the amount of time spent on each of the several kinds of work done, entering it in the column headed "chargeable" if it is productive time, and in the "non-chargeable" column if it is non-productive. He then totals the two columns, and sees that the total time noted on the ticket agrees with the total hours worked by the employee. As will be seen by referring to the simple calculation above, which showed that on Job No. 4,322 the compositor was working at hand composition for 3.3 hours, the extensions of time are quickly made and there is little chance of error. As soon as the extensions are made on all the time-tickets the cost clerk proceeds to enter the time on the job records, giving the date, the operation number, and the amount of time. This he does each day. (See reproduction of the job record in chapter four.)

For overtime and night work the same ticket is used, for, as will be seen, by starting with seven o'clock and continuing the time-units until seven o'clock is again reached, we really provide for twenty-four hours. Overtime tickets are marked "overtime," and a separate ticket from that for regular time is used.

It will be noticed, too, that we do not omit lunch time. I do not believe there was ever an office in which it was never necessary to work thru the noon hour.

In addition to the time-ticket for hand composition, a

ticket must be used for monotype and for linotype composition. Except that these tickets show different operations and show the number of the machine (on the monotype both keyboard and caster are numbered) they are the same as the hand composition ticket, and are used in the same way. For monotype keyboard work the operator is the unit and not the machine; for caster work the machine is the unit and not the operator. Each keyboard operator fills out a ticket every day, and a time-ticket must be made out each day for each caster. We do this because one operator can operate but one keyboard, while one man can and does run more than one caster. On the linotype, again, one operator can run but a single machine, and therefore the man is the unit. We could, of course, use the machine as the unit in all cases, but it would serve no good purpose and would tend toward confusion and complication.

In the press-room we use two time-tickets—one for each press and one for each workman. The same ticket is used for both men and machines, the only difference in them being that the ticket for the press is marked “machine,” and that for the workman “individual.” It is best to use stock of a different color for the individual ticket. In the press-room the machine is the unit, and a ticket must be made out each day for each press whether the press is used or not. The tickets are the same as that for the composing-room, except that the operations are different and a place is provided for the number of the press, the name of the pressman, and the name of the feeder. The individual press-room ticket is used for the recording of chargeable time which is not press time and

need not be filled out in full except when the workman is employed on such work during the entire day, tho of course it may be completely filled out if the management so desires. Personally I use it only during the time the workman is actually engaged in work other than press-work which can be charged for, leaving the remainder blank. I do this because the press tickets show every transaction in the press-room having anything to do with the presses, and they are always completely filled out. In the list of press-room operations the reader will see a number of items marked "i." These "i" items are the ones taken care of on the individual ticket.

In the bindery the work-people are classified according to the amount of wages paid. Ordinarily three classes are all that are needed, and in the small plant one will generally be enough. We should never use the classifications, "girls' hand work," "small-machine work," "large-machine work." because such terms are so indefinite that they have next to no meaning. Some girls are paid more than some boys. A machine may be small and yet be very expensive.

Except on such machines as folders, where one man operates more than one machine, the workman is the unit in the bindery. So that machine time may be readily distinguished, the time of helpers on stitchers, cutters, and the like, is designated as helper's time on the machine worked on. Very often two and sometimes three operatives are employed on a stitcher, one of them running the machine and the others helping. If the time of the two or three were entered as stitcher time we would not know the length of time the machine itself

was at work, but we know all about it when we use the term, "helper on stitcher."

The work items or operations were originally compiled by me, and in 1911 I revised them for the cost-system installation work of the United Typothetæ of America. The items were arranged in alphabetical order, as they should be. In 1913 the list was reissued by the U. T. A., and while the items themselves were not changed in any important particular, the alphabetical order, I regret to say, was destroyed in a vain attempt to place first in each department list the operations most commonly employed. The change was unnecessary and unwise. The operations in most common use can best be made prominent by printing them in black-faced type. I decided on the alphabetical order only after a great deal of experience with time-tickets on which I had listed most of the operations given below, and after giving the matter very careful consideration. To show why the alphabetical arrangement is best I need only point out these facts: A workman in any department is regularly doing but a very few kinds of work. The first day he uses one of these tickets he becomes familiar with the numbers of the three or four things he regularly does, and hence does not refer to the list in entering such time. When he has occasion to do a kind of work different from his regular line, he can the more readily find it and its number if the items are arranged alphabetically. To illustrate the point, take hand composition: in the main the workman is setting type, making up, locking up, or distributing. After the first day or two he knows that hand composition is item No. 21, that make-up is No. 29, that

lock-up is No. 28, and that distribution is No. 16. He never need look for these operations; he knows their numbers by heart, and consequently loses no time searching thru the list for them. Suppose, now, he is called on to divide a two-color form, a kind of work he seldom does: don't you see how much time he will save if he can run down an alphabetical list till he comes to "D," when he at once sees that "dividing for colors" is No. 17? With an alphabetical list he finds the operation almost instantly, while with the items all mixed up he must search thru an entire list of forty-two operations.

The work items are as follows:

COMPOSITION

HAND WORK

- 1.† Accidental delays—explain on back.
- 2.* Arranging in alphabetical order.
- 3.* Caring for live matter.
- 4.†*Changes or corrections on press— explain on back.
- 5.† Changing bad letters or characters on press.
- 6.† Changing bad letters— monotype.
- 7.†*Checking advertisements.
- 8.* Collating (or assembling) copy and cuts.
- 9.* Collating (or assembling) linotype matter.
- 10.* Collating (or assembling) monotype matter.
- 11.* Correcting monotype matter.
- 12.* Customers' alterations— hand.
- 13.* Cutting linotype slugs.
- 14.† Cutting material for general equipment.
- 15.* Cutting special material for specific job—explain on back.
- 16.† Distribution.
- 17.* Dividing for colors.
- 18.†*Editing copy—and preparing copy.
- 19.* Foundry lock-up.
- 20.* Hand advertisement composition.

- 21.* Hand composition.
- 22.† Holding copy.
- 23.† Hunting for lost pages, electros, cuts, or other things—state what on back.
- 24.† Hunting for sorts—state what on back.
- 25.* Inserting linotype customers' alterations.
- 26.* Inserting linotype office corrections.
- 27.† Laying cases.
- 28.* Lock-up.
- 29.* Make-up.
- 30.†* Mortising cuts.
- 31.* Mounting cuts.
- 32.* Office corrections.
- 33.* Packing and boxing customers' cuts.
- 34.* Preparing index.
- 35.† Proof-reading.
- 36.* Proving galleys.
- 37.* Registering forms.
- 38.† Relocking forms.
- 39.† Resetting.
- 40.† Revising.
- 41.* Special proofs for customer.
- 42.* Trimming, squaring, and making cuts type high.

LINOTYPE DEPARTMENT

- 101.† Accidental delays—explain on back.
- 102.† Caring for machine.
- 103.* Casting borders and other material.
- 104.* Changing machine.
- 105.* Composition.
- 106.* Customer's alterations.
- 107.* Office corrections.
- 108.† Repairs.
- 109.† Resetting.
- 110.† Smelting.
- 111.† Waiting for copy.

MONOTYPE DEPARTMENT

- 151.† Accidental delays, keyboard—explain on back.

- 152.† Accidental delays, caster—explain on back.
- 153.† Caring for keyboard.
- 154.† Caring for caster.
- 155.* Changing keyboard.
- 156.* Changing caster.
- 157.* Composition, keyboard.
- 158.* Composition, caster.
- 159.* Customers' alterations, keyboard.
- 160.* Customers' alterations, caster.
- 161.* Office corrections, keyboard.
- 162.* Office corrections, caster.
- 163.† Repairs, keyboard.
- 164.† Repairs, caster.
- 165.† Resetting, keyboard.
- 166.† Resetting, caster.
- 167.† Smelting.
- 168.* Sorts casting.
- 169.† Waiting for copy, keyboard.
- 170.† Waiting for spool, caster.

PRESS-ROOM

- 201.† Accidental delays—explain on back.
- 202.i*Bronzing, including dusting.
- 203.†*Changes and corrections in forms.
- 204.† Changing bad letters.
- 205.* Changing rollers.
- 206.* Chargeable standing time.
- 207.i†Cleaning sheets.
- 208.* Embossing.
- 209.† General wash-up.
- 210.* Holding press account customer's proof.
- 211.i*Jogging.
- 212.†*Lifting forms.
- 213.* Make-ready.
- 214.† Making up shortage.
- 215.* Mixing ink.
- 216.† Oiling.
- 217.i*Piling stock.

- 218.* Pulling press proofs.
- 219.* Registering.
- 220.† Repairing—general—explain on back (“i” time when it does not hold a press).
- 221.†*Repairing plates—holding press.
- 222.i†*Repairing plates—not holding press.
- 223.* Running.
- 224.i*Slip-sheeting and removing slip-sheets.
- 225.† Standing-time.
- 226.* Standing-time account customer—explain on back.
- 227.† Standing-time, faulty composition.
- 228.† Standing-time, faulty imposition.
- 229.†*Standing-time, faulty plates.
- 230.† Standing-time, laying plates wrong.
- 231.† Standing-time, rollers run down.
- 232.* Wash-up account customer.
- 233.† Waiting for feeder.
- 234.† Waiting for form.
- 235.† Waiting for ink.
- 236.* Waiting for ink to dry on short runs work-and-turn.
- 237.† Waiting for O.K.
- 238.† Waiting for stock.

STOCK HANDLING

(To be placed on press-room ticket)

- 251.† Counting and cutting stock for press or bindery.
- 252.† Opening cases or packages, and checking invoices.
- 253.† Piling and putting away stock.

SHIPPING

(To be placed on press-room ticket)

- 276.* Boxing or wrapping completed work.
- 277.† Baling waste paper.

THE BINDERY

- 301.† Accidental delays—explain on back.
- 302.* Addressing.
- 303.* Backing.
- 304.* Benching.
- 305.* Beveling.
- 306.* Bronzing, including wiping.

- 307.* Canvas cover making.
- 308.* Caring for work in process.
- 309.* Casing in.
- 310.* Check binding.
- 311.* Cleaning.
- 312.* Collating.
- 313.* Counting.
- 314.* Covering.
- 315.* Cutting boards.
- 316.* Cutting cloth.
- 317.* Cutting leather.
- 318.* Drawing off and fanning strings.
- 319.* Edging or marbling.
- 320.* Enclosing in envelops.
- 321.* Feeding folding-machine.
- 322.* Feeding ruling-machine.
- 323.* Finishing.
- 324.* Folding.
- 325.* Forwarding.
- 326.* Gathering.
- 327.* Gumming.
- 328.* Helper on cutter.
- 329.* Helper on gathering-machine.
- 330.* Helper on stitcher.
- 331.* Helper on Smythe.
- 332.* Indexing.
- 333.* Inserting.
- 334.* Interleaving.
- 335.* Jogging.
- 336.* Laying on gold.
- 337.* Lining up and headbanding.
- 338.* Mailing (sacking and routing).
- 339.* Making cases.
- 340.* Making-up.
- 341.* Miscellaneous—explain on back of ticket.
- 342.* Padding.
- 343.* Paring leather.

- 344.* Pasting.
- 345.* Patent back.
- 346.* Piling stock.
- 347.* Putting in and taking out of press.
- 348.* Re-enforcing.
- 349.* Rounding books.
- 350.* Rounding cases.
- 351.* Sawing.
- 352.* Sewing books.
- 353.* Sewing with silk on thread.
- 354.* Slip-sheeting and removing slip-sheets.
- 355.* Strapping, blank.
- 356.* Strapping, gold.
- 357.* Stripping.
- 358.* Stringing.
- 359.* Taking apart.
- 360.* Tying.
- 361.* Tipping.
- 362.* Tissuing.
- 363.* Wrapping.

MACHINE WORK

- 365.† Accidental delays—explain on back.
- 366.* Baling.
- 367.* Bronzing.
- 368.* Bundling.
- 369.* Crimping.
- 370.* Cutting.
- 371.* Embossing.
- 372.* Eyeletting.
- 373.* Folding—setting machine.
- 374.* Folding—running machine.
- 375.* Gathering—setting machine.
- 376.* Gathering—running machine.
- 377.* Indexing.
- 378.* Numbering or paging.
- 379.* Patent back.
- 380.* Perforating—set machine.

- 381.* Perforating—running.
- 382.* Punching—set machine.
- 383.* Punching—running.
- 384.† Repairs—explain on back.
- 385.* Roughing or pebbling.
- 386.* Round-cornering.
- 387.* Ruling—drawing pattern.
- 388.* Ruling—setting pens.
- 389.* Ruling—proof out.
- 390.* Ruling—running.
- 391.* Sawing.
- 392.* Scoring.
- 393.* Sewing.
- 394.* Smashing.
- 395.* Stamping.
- 396.* Stitching.
- 397.* Trimming.
- 398.† Waiting for sheets, signatures, etc.—explain on back.

STOCK HANDLING

(To be placed on bindery ticket)

- 251.† Cutting and counting stock for press and bindery.
- 252.† Opening cases or packages and checking invoice.
- 253.† Piling stock.

SHIPPING

(To be placed on bindery ticket)

- 276.* Boxing or wrapping completed work.
- 277.† Baling waste paper.

THE SMALL SHOP

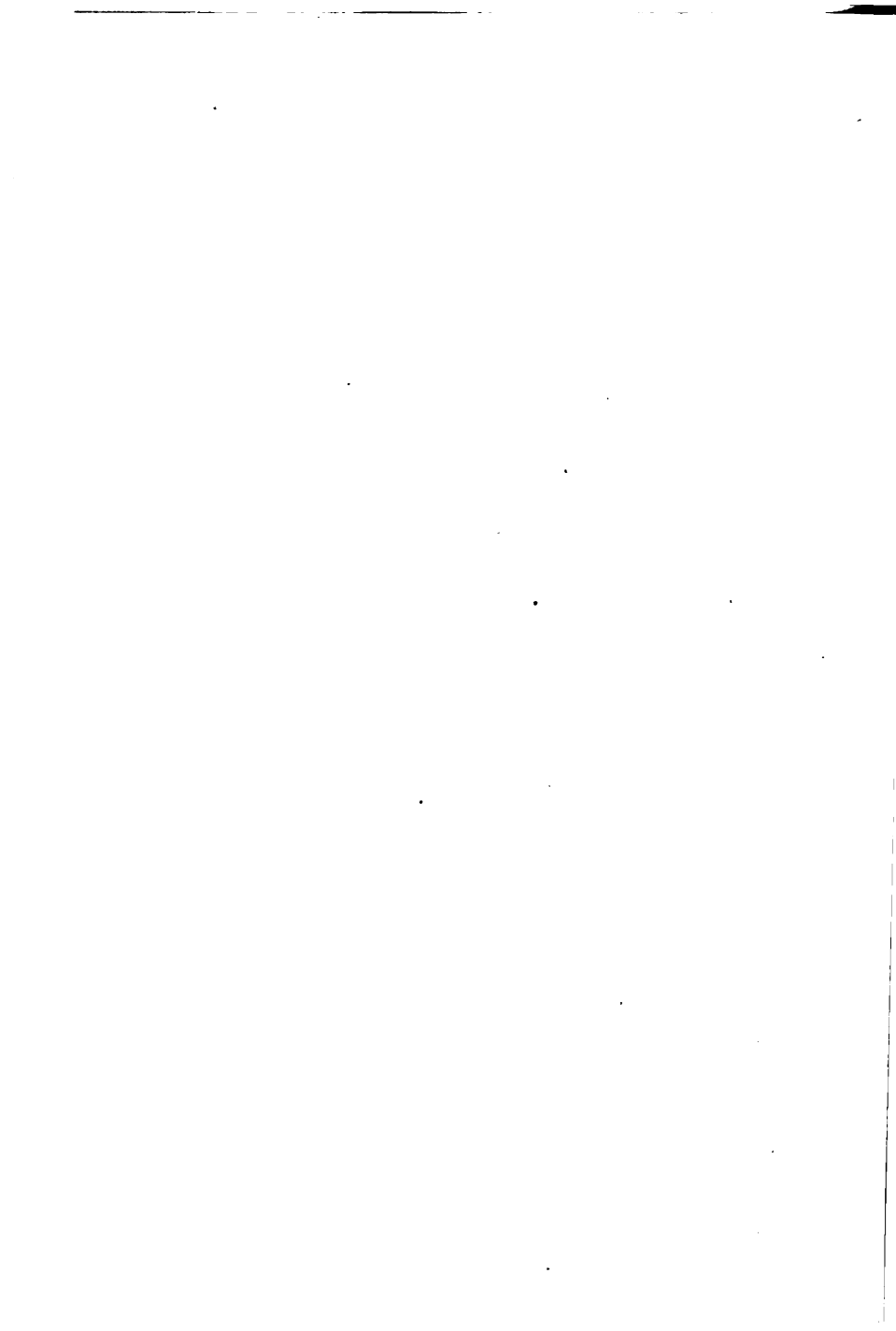
The daily time-tickets illustrated and described above are for use in plants with ten or more presses and employees. While they can be used in the very smallest shop, most printers, including the writer, prefer a combination ticket when less than ten people are employed. In the small shop the employees must work in two or more departments, and it is handier for them to have

DAILY TIME TICKET

Six-minute Period when you are not working, say so on the ticket.

We want the Actual Time on the Job.

Name.....		Clock No.		Date.....		191.....	
TIME	JOB NO. AND NAME	WORK	TIME	JOB NO. AND NAME	WORK		



time-tickets on which provision is made for recording on a single sheet the time put in in the several departments. The small-shop form is essentially the same as that for the large plant; it differs from that ticket sufficiently, however, to make it worth while to show the form, as it will be understood more readily. An examination of the form will show it to be extremely simple, and as easy to use as the forms for the individual departments. The list of operations on the small-shop form includes only the work-items most commonly used. A complete list of operations should be posted in several parts of the plant, so that workmen may quickly find additional operations and their numbers should occasion require. The following operations cover most of the work done in the small plant:

COMPOSITION

- 4.†*Changes or corrections on press.
- 5.† Changing bad letters on press.
- 8.* Collating copy and cuts.
- 12.* Customers' alterations—hand.
- 13.* Cutting linotype slugs.
- 15.* Cutting special material for specific job—explain on back.
- 16.† Distribution.
- 17.* Dividing for colors.
- 19.* Foundry lock-up.
- 21.* Hand composition.
- 22.† Holding copy.
- 24.† Hunting for sorts—explain what on back.
- 25.* Inserting linotype customers' alterations.
- 26.* Inserting linotype office corrections.
- 28.* Lock-up.
- 29.* Make-up.
- 32.* Office corrections.
- 35.† Proof-reading.
- 37.* Registering forms.

PRESSWORK

- 202. i*Bronzing.
- 203. †*Changes and corrections in forms.
- 204. † Changing bad letters.
- 208. * Embossing.
- 209. † General wash-up.
- 211. i*Jogging.
- 212. †* Lifting forms.
- 213. * Make-ready.
- 214. † Making up shortage.
- 218. * Pulling press proof.
- 219. * Registering.
- 223. * Running.
- 224. i*Slip-sheeting and removing slip-sheets.
- 225. † Standing time.
- 232. * Wash-up account customer.
- 236. * Waiting for ink to dry on short runs work-and-turn.
- 237. † Waiting for O.K.

BINDERY — HAND

- 310. * Check binding.
- 314. * Covering.
- 324. * Folding.
- 326. * Gathering.
- 333. * Inserting.
- 334. * Interleaving.
- 335. * Jogging.
- 342. * Padding.
- 353. * Sewing with silk or cord.
- 358. * Stringing.
- 363. * Wrapping.

BINDERY — MACHINE

- 370. * Cutting.
- 378. * Numbering or paging.
- 381. * Perforating.
- 386. * Round-cornering.
- 396. * Stitching.
- 397. * Trimming.

The foreman, or some one to whom the manager delegates the authority, must see to it that the daily output of machines and operatives is entered on the daily time-tickets. We want the number of thousand ems set by linotypes and monotypes; the number of impressions produced by each press during its actual running time; the number of folds made, signatures gathered, booklets stitched, sheets punched, and so on for all bindery work. In cost accounting we find the hour cost of all the kinds of work, and our charges for printing should be based on the time required for the work; but before we can accurately estimate the time a given job will require before it is done, we must know the average output of both men and machines. Curiously enough, the average printer has greatly exaggerated ideas of the output he is getting in a given time from both men and machines. I have never yet found a printer of the old school who did not claim that the output per hour in his own plant was far greater than the average shown to be correct by the cost system. Next to learning what the true hour cost is in each department, the most important information given by the standard cost system is the hourly output. No one can make accurate estimates on printing who does not have accurate knowledge of hourly output; nor can a manager without such knowledge bring his plant up to even a fair degree of efficiency.

Chapter Eight

Productive and Non-Productive Time

THERE is some difference of opinion in regard to whether certain operations should be considered productive or non-productive. It would make no difference in which classification these operations were placed if all printers would classify them alike. As they do not, we must use the classification adopted by the majority, for to do otherwise would destroy the basis of comparison between plants which is proving so valuable.

There can be no question about the classification of most items. It appears, too, that we are agreed in everything except a few composing-room items. A few printers would include distribution with the productive items, and so that the time required for the distribution of a given job may be known and charged to that job, a slip on which is written the job number is inserted somewhere in it. The distributor finds this slip and is thus enabled to enter the number of the job on his time-ticket. It is a waste of time to do this. Scientific distribution is impossible when the plan is followed, for it means that each job must be separately handled by the distributor. The procedure that should be followed is to separate on the dead stone the various sizes and faces, at the same time sorting out such things as leads, slugs, and rule. This plan saves a big percentage of distribution

Distribution and proofreading 71

time, all of which will be lost if each job is distributed separately. Besides, distribution can seldom be done the moment a job is off the press, because, in the first place, to do so would be unsafe, and in the second the economical handling of the composing-room work demands that certain classes of distribution take precedence. It is best, therefore, to class distribution with non-productive items.

Proofreading is another operation over which there has been considerable discussion. There is really no good reason why it should not be classed with the productive operations, unless the fact that on small job work the reading time is so short that it can not well be itemized is a good reason. Nevertheless, the majority of printers class proofreading time as non-productive, and because uniformity is the great desideratum we will find it much to our advantage to do likewise. While there is substantial agreement that proofreading is non-productive, it must none the less be charged for on some classes of work, as for example a dictionary. The statement has been made—tho I can not vouch for its truth—that the proofreading on the Standard Dictionary cost more than the composition. The cost of proofreading will average about as much per hour as the cost of operating a linotype; but as one reader will, with a copy holder, take care of about three machines, the reading cost per machine will approximate a third of the total cost of operating it, or about fifty-three cents. Reduced to cost per thousand ems, this means a cost of about seventeen cents per thousand. The result is substantially the same with hand composition, for fifteen men will set the equivalent, approximately, of nine thousand ems an hour, and one

72 Office corrections are productive

reader and his assistant will, on everyday work, take care of the output of fifteen men. As the cost of reading is about one dollar and sixty cents an hour, the cost for reading is about seventeen cents. When reading is carried as non-productive time its cost is added to all the other items of expense, and it is paid for just as truly as it would be were it made a separate charge, each sold hour of composing-room work bearing its full part of the proofreading expense. The trouble with this plan is that it makes work which should carry no proofreading charge stand the same proportion of the cost of reading that actual composition stands. For instance, there are jobs requiring comparatively little composition time which take more than the usual percentage of time to read; and other jobs can be read in a few minutes altho the composition time amounts to several hours. Again, such work as making up, dividing for colors, locking up, registering, and the like, take up none (or at least very little) of the time of the proofreader; nevertheless, when proofreading is carried as non-productive time, each hour of such work carries as great a proportion of proofreading expense as does an hour of straight composition. However, as stated above, uniformity is the important thing, and while I think proofreading should be placed in the productive class, I would not make the change until, after full discussion, a convention of the United Typothetae and Franklin Clubs votes in favor of it.

The item causing the greatest amount of discussion is office corrections. Ninety-nine per cent of the printers using time-tickets charge correction time as a part of composition time, and do so rightly. The U. T. A. in-

structions to the men it employed to install cost systems were that office corrections should be charged as productive time. I shall, therefore, continue to carry office corrections as a productive operation, my reasons for doing so being based on established precedent.

1. I have never yet seen a compositor or machine operator who could produce errorless composition. We look for, expect, and nearly always find something that must be changed or corrected in every piece of composition. A reasonable time allowance for the making of a reasonable number of corrections or changes is fair and right.

2. No customer will pay for uncorrected matter. He pays for matter set according to copy and free from typographical errors. Therefore, in the true meaning of the term, type is not set until after it is corrected. For this reason the time necessary for making a reasonable number of changes and corrections should be charged as a part of the composition time.

3. The courts have uniformly held that the printer is responsible for departures from copy and for typographical errors even tho the customer has read and O.K.'d the proof. The reasoning of the courts is that the customer is not an expert in matters typographical, and that, therefore, he can not be expected to pass as an expert on the work he employs an expert to do. The reasoning is sound. If, therefore, the printer must be responsible for errors whether or no, he is certainly entitled to pay for the time it takes to correct them. If this be true, office-correction time is productive.

4. If office corrections are classed as non-productive, the result will be to charge all productive work other

than composition with as great a proportion of the cost of making corrections as will be charged to composition itself. Manifestly this would be an injustice. We have, say, a job in which a large number of press changes must be made by a compositor, the time required for them amounting to ten hours. So far as the changes are concerned no composition time is involved, and consequently no correction time; so why should the ten hours bear any part of the cost of office corrections? They should not, nor will they if corrections are carried as productive time; but if they are classed as non-productive, each hour of the ten will be charged with as great a sum to cover correction expense as will an hour of straight composition. There can be no controversy over the truth of this statement. It is self-evident that composition should take care of the cost of its correction, as it will if office corrections are classed with the productive operations. Office corrections, therefore, should be included with the productive operations.

It is often said that the individual customer should not be forced to pay for the inexcusable errors of the incompetent workman. The answer to that is, the management should not employ incompetents; and if the customer must have his printing so quickly that incompetents must be temporarily put to work, the customer of right ought to pay the extra cost entailed by such workmen, just as he pays extra for overtime and Sunday work.

The more operations we can charge for—that is, the more items we can class as productive—the lower the hour cost will be, and the easier it will be to prove to the customer that our charges are fair. While it would be un-

wise to include distribution with the productive operations, owing to the increased cost of doing that work such inclusion would bring about, we will include office corrections.

There is a class of office corrections which can not be productive. For instance, in every well-managed plant all forms are corrected before they are sent to press. But even with the best management it will sometimes be necessary to make corrections on the press which should have been made before the form was locked up. In such a case, if the fault is with the office, the time is non-productive, for it would be too much like trying a man twice for the same offense to charge the customer for press corrections due to carelessness in not making them before the job was handed to the stoneman. All such operations are separately listed, and a dagger denotes that they are non-productive.

It may be well to mention item No. 6, "changing bad letters—monotype." It occasionally happens that a defective matrix will make it necessary to replace a comparatively large number of some certain character. When this occurs some one is given the task of replacing the characters, and the work is generally done before the type is proved. The time spent in making such changes must be paid for by the office, just as the cost of time lost thru a break-down on a press is an office expense.

Mistakes due to the stupidity of the workman, the foreman, and quite often the one making out the order, are of more or less frequent occurrence. A job may be set the long way of the stock when it should be the short way, or vice versa. One man, in a list of items and prices,

may use a comma after the item and a semicolon after the price, while another on the same job may use no point at all after the item and a comma after the price. Stupid errors of this sort are not the fault of the customer, and can not be charged to him. Not infrequently they necessitate resetting a part or all of the job. Operation No. 39 provides the means for taking care of such inexcusable blunders.

There are few if any differences of opinion regarding the classifications of the press-room and bindery time, and therefore no explanations are needed. The stock-handling and the shipping operations may be mentioned, however. In the plant large enough to employ a regular stockman his time is a direct charge that is added, on a percentage basis, to the cost of the stock. There are, of course, other items of expense incident to the handling of stock, which will be explained later. Because stock-handling expenses are a direct charge against the stock, the operations must be classed as non-productive.

While boxing or wrapping work for shipment are non-productive operations, and are to be included with the general expense of doing business, a fair delivery charge should be made whenever possible. The shipping department is to be credited with all receipts from deliveries, and the difference between such receipts and the total shipping expense carried to the general expense account. It is possible, tho not probable, that the shipping department will show a profit. Inasmuch as shipping expenses are included with general office expense, the work items are classed as non-productive.

The shipping and stock-handling operations are listed

Shipping and stock-handling 77

on both press-room and bindery tickets. This is because in small and medium-sized plants the shipping and stock-handling are looked after by one or both of these departments. The operations are listed on the time-tickets because we want to know how long it takes to make a given shipment or take care of a given quantity of stock.

The time of errand boys and wagon drivers is not entered on time tickets; instead, the expense of such help is included with the general expense of doing business.

Chapter Nine

Daily and Monthly Summaries

THE summary-sheet is sometimes called a "pay-roll-sheet." That is not a good name, because the pay roll is only an incident. The summary-sheet is a blank on which is summarized the productive and non-productive time, and the output of men and machines for each day and each month. Except in the press-room the productive time is not classified on the summary-sheet, and in the press-room the classification goes but little further than is necessary to show the total number of impressions made during the actual running time. While hand work in the bindery is classified in accordance with the wages paid to groups of operatives and groups of machines, there is no classification of the various kinds of work done by any one group; nor is any such classification needed, except on the job record.

It is true that a summary-sheet shows the amount of money paid out in wages; but so does the regular pay roll. Were it not for the fact that in every office, large or small, some employees work in more than one department, we would not bother with wages on the summary-sheets, and when the wage of each employee is charged to the department in which he works even when his time is divided between two or more departments, we get our labor expense direct from the pay roll.

DATE _____ 191__

MACHINE COMPOSITION

MONOTYPE COMPOSITION

KEYBOARD

CASTER

Hours
Worked

Prod.
Time

Non-
Prod.
Time

Mch. No.

Hours
Worked

Prod.
Time

Non-Prod
Time, Inc.
Smelting

Number
of Ems

Smelting
Time

*k is done by a machine operator and a machine is idle during the time.

Each day we must have a record of the productive and non-productive time of each employee and machine, and with it we want a record of the output—of what has been accomplished. There are some kinds of work on which output can not be measured in units of product—as hand composition on miscellaneous job work, or press make-ready. But we can, and with the standard cost system do, get the time spent on all such work, and by comparing it with the time spent on other jobs similar in character, we can judge quite accurately whether or not a given piece of work has been done in a reasonable period of time.

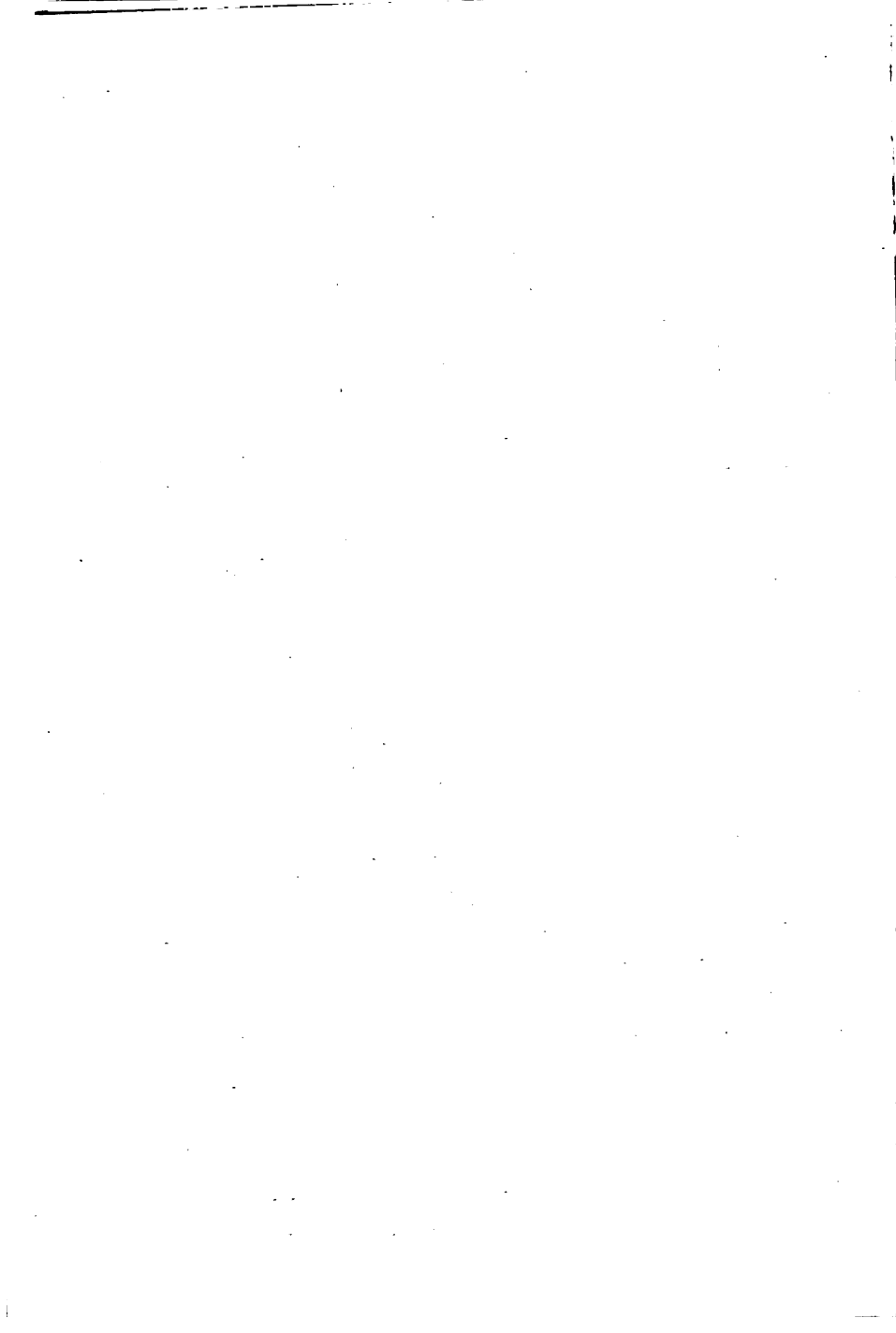
On the reproductions of composing-room and bindery daily summary sheets shown herewith the reader will note that the first column following the names of the workmen is headed "Hour Rate." This column need not be used if the pay roll shows the exact amount of wages chargeable to each department during every calendar month. Few pay rolls show this, however, for weekly pay rolls seldom agree exactly with calendar months, and the pay of foremen, proofreaders, and very often the workmen themselves, must be charged to more than one department. Foremen and superintendents are not required to make out daily time tickets except during such time as they may be actually doing productive work. Their non-productive time is to be prorated over the departments in their charge just as the expenses of the business office are prorated over the several departments of the plant. The method of prorating or distributing such time will be described later. Proofreaders fill out time tickets just as other workmen do, and differentiate

between machine reading and hand reading by the notations, "mch.," or "hand," in the space with the job number. Proofreading is non-productive time, to be sure; but unless the reader makes out a time ticket each day we can not know accurately how much of his time is chargeable to hand composition, nor how much to machine work. If we prorate the cost of this time in the same way that we distribute general expense, we are quite likely to give one of the departments too much. A foreman, on the other hand, is in constant touch with all the departments in his charge, and the time he devotes to each is so interwoven with that given to the others, that a fair division on any other than a percentage basis would be impossible.

To the daily summaries are posted the totals of the daily time tickets. The time entries on the daily time tickets are footed up, and the totals of the productive and non-productive columns are carried to the daily summaries and entered opposite the names of the workmen (or the number of the machine), as is also the total output for the day of each man and machine, if the work can be measured in units of output. Very little time is required for these entries, as they are merely copies of the daily time-ticket footings. The daily summaries allow the manager to make comparisons between employees on the same class of work, and with the job record give information which enables him to bring the plant up to the highest possible state of efficiency.

In every fair-sized shop there are two departments in the composing-room—hand and machine. Hand work may be subdivided into book and job departments, and

[illegible]



perhaps into other subdivisions; but, even so, the portion of the summary-sheet devoted to hand composition on the blank shown herewith will take care of them all. The same is true of the summary devoted to each of the other departments or subdivisions. For, after all, composition is composition, and presswork is presswork, no matter where or in what sort of plant the work is done. Nor does the so-called "specialty" plant affect the matter.

No provision is made for showing the wages of the individual on any of the summary-sheets except on the small-shop or combination form. We are not interested in the individual wages except in so far as they must be divided between two or more departments. What we must know is the total amount of money expended for labor in each department each day, the number of hours the money pays for, and the total number of productive and non-productive hours. This information is transferred to the monthly summary, which transfer requires little time and no great ability, for it involves nothing arduous.

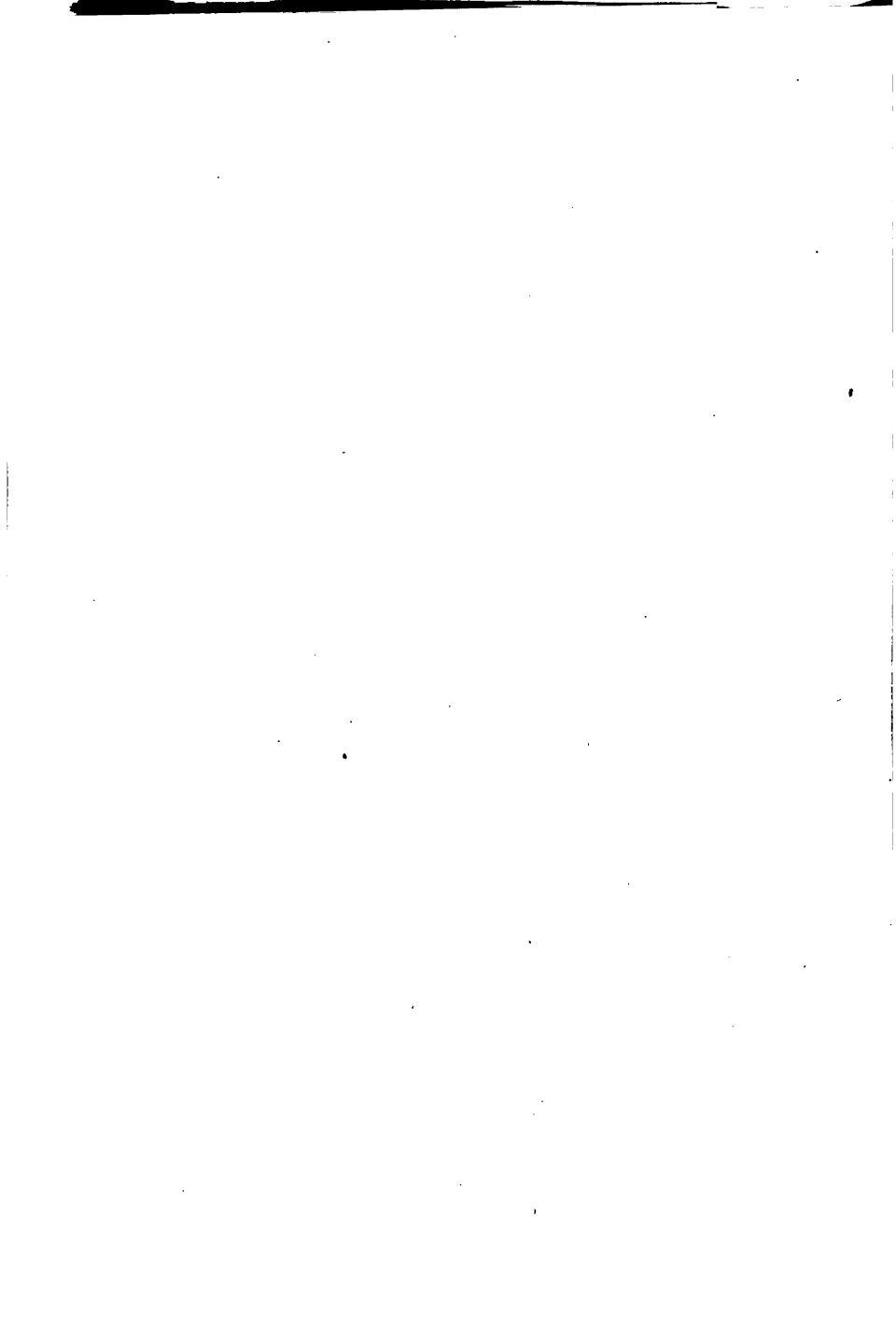
The "productive per cent" line is important only for showing in a general way the health of the business. If the productive time in the hand-composition department drops below sixty per cent and stays there for any considerable period, the business is unhealthy, and it is up to the management to diagnose the case. The same is true when machine composition continues to show less than eighty per cent of productive time; presses less than sixty per cent; bindery hand work less than ninety per cent. There is no standard for machine work in the bindery, because so many bindery machines are necessarily idle for long periods of time.

82 Linotype and monotype composition

Linotype and monotype composition are placed in separate departments, because the process of operating the two classes of machines varies so radically, and because, too, there is a marked difference in the cost of operation. An examination of the composing-room summary-sheet will show that the machine divisions are the same as those of the part devoted to hand work, except that provision is made for recording the number of ems set. The recording of the output of typesetting machines is of an importance second only to the recording of the time required for the composition, for unless we know the amount of composition done in a given time the knowledge of the time put in will be well-nigh valueless. Pick up the first piece of printing you see which was set on a machine, and without knowing the number of ems of composition, except as you may be able to estimate the quantity without measuring it, tell me how many hours were required for the machine work. You will find that an accurate estimate of the time is impossible. Now take a job on which the exact amount of machine time is known, and tell me how many ems of composition it contains. You will find this problem just as impossible of solution as the other, unless you have made it a practice to measure the output of your machines every day, and therefore know the average hourly output you get from them. A large shop in which I installed the standard cost system about a year previous to the date on which this was written was figuring an average output of thirty-five hundred ems an hour from its linotypes. Under the standard system the time was of course kept and the output measured, when it was found that the output was

191

es



Summary sheets for all departments 83

averaging twenty-three hundred ems an hour instead of thirty-five hundred. The management learned that it had been unable, previous to the installation of the system, correctly to estimate the hourly output or the time a given job would require. This is not an isolated case. In all my experience I have never found a plant without a system the management of which could estimate with any greater accuracy, and this in spite of the fact that most managers claim to know all about time and output.

The summary sheets are practically the same for all departments. On the press-room form, however, we find it necessary to add several columns, because we want information about more than one kind of work. We want to separate make-ready and running time, and we want the miscellaneous productive time that is neither make-ready nor running. Also, we want the individual time that is chargeable to the customer—the value of which you will find foots up to a tidy sum if you will look after it. We show daily summary forms for the three departments because they are so simple that to see them is to understand them. It is not necessary to show the monthly summary sheet for each department, because, as will be seen by the reproduction of the bindery hand-work form, the monthly is merely a sheet on which is recorded the totals of the daily summary.

As has been stated previously, hand work in the bindery is classified according to the wages paid. In the small plant, with only a few machines which are employed less than fifty per cent of the time, it is not worth while to keep track of the time of the individual machines, tho if one cares to do so there is no objection to it. Equally

accurate results will be obtained if the work is classified just as hand work is classified.

In practically every plant of fair size three hand-work classifications will be found sufficient; in the small shop one is ample. Class C includes all employees receiving eight dollars a week or less; class B, sixteen dollars a week or less; class A, over sixteen dollars a week. Where bindery machinery is used less than fifty per cent of the time the hour cost will be higher than the price we can charge the customer, which means that the difference between the high cost found and the average cost on which the selling price must be based, must be charged to the department overhead and taken care of just as any other expense is cared for. Because of this fact we will save work and arrive at equally accurate results if, when bindery machinery is seldom used, we classify it just as we do composing-room equipment—consider it a tool, in fact—and take into account only the operatives, adding to wages expense all the expenses incident to such machinery. In the very small shop this plan works exceedingly well; in the larger one, however, it is best to separate all hand and machine time, except that equipment such as table shears, standing presses and the like is always to be placed in the classification of tools used by hand workers. The spaces for the main headings over the sections devoted to machine work are left blank so that the machine or group of machines taken care of in the section may be written in by the cost clerk.

The bindery summary sheets are the only ones printed on both sides. The back is used for recording output, a number of columns being necessary because so many

ASS C

Pro-
ductive
Time

Non-Pro-
ductive
Time

TOTALS

PROD. PER CENT

ily summaries

[illegible]

bindery operatives do several different kinds of work. The recording of the output of operatives involves the counting of the sheets folded, pamphlets stitched, sections gathered, and so on. On small jobs the quantity is known before the work starts, and counting is mostly unnecessary; on some jobs the operative will count as the work progresses; but on large jobs it is often necessary for some one to count the work of each operative. But no matter how it is done, counting is of immense importance, and instead of the cost of it being an expense, the manager will find that the recording of output so increases production that the profits will be greatly increased.

If the reader will refer to the chapter on daily time tickets he will find a form of ticket for use in the small shop. That ticket is used with the combination daily and monthly summary shown herewith. In the small shop the employee must work in two or more departments, and the time given to each must of course be separately noted if we are to learn the hour cost. Hour costs in the small shop are higher than in the large, on many kinds of work; but as they are lower on other kinds, the average of all costs will not vary much, tho the large plant has the best of it, generally speaking. This matter, however, will be considered later on; it is mentioned here to point out the obvious fact that when a forty-cent man does the work that in a large shop is done by a ten-cent girl, the hour cost in the small plant will certainly be higher. The combination summary is used just as the department summaries are used in the large plant. One summary-sheet is made out each month for each employee and for each press. The time is divided between the

departments on the combination time ticket, from which the total chargeable to each department is posted to the correspondingly dated line on the combination summary. To all intents and purposes the combination summary is the same as the department forms used in the large plant, and gives the same information. The blank is a time saver in the plant employing but seven or eight work people. In the large shop, however, the blank would increase the work, because of the large number of sheets that must be handled each day.



COMBINATION DAILY AM

Name		Rate per hour							
Date	Total hours	Total payroll	Office	Stock and Delivery	COMPOSITION		PRES		
					Prodtve	Non-prod	Prodtve	Non-prod	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
Totals									
Pr. ct. prod									

On this sheet are posted the totals from the combi

2 MONTHLY SUMMARY

€ per day

Month of

191

[illegible]

n daily time tickets used in small shops

To
Pr. cl

Chapter Ten

The Monthly Statement of Cost

THE monthly statement of cost is the blank which, when correctly filled out, shows us how much it costs per hour to do work in any of the departments and sub-departments of a printing plant.

At the same time it shows the total department cost. It shows, too, the cost per thousand ems, thousand impressions, or thousand of any other sort of work in which the output can be measured in thousands. On this sheet also is recorded the average hourly output of workmen and machines.

As will be seen by referring to the reproduction herewith, the monthly cost-sheet is so made up that it provides for all possible expenses of the business and takes care of all the departments. We show but one side of the blank; additional departments and sub-departments are provided for on the back.

Our problem is to find the cost of operating each department and sub-department. When we know what that cost is, we can quickly find the cost of a single hour of any of the various kinds of work, for it is then simply a matter of dividing the total cost by the total sold hours of a department. The solution of this problem was by no means easy. The correct answer was found only by years of patient study. There were wide differences of opinion

on many phases of the problem, most of them due to an imperfect understanding of the questions involved. The matter on which there was the greatest difference was the method of taking care of the business-office expense. This question was argued pro and con by the delegates to the first cost congress in Chicago, in 1909, when the correct method of distribution was declared to be that adopted in this treatise. Numerous national, district and state congresses have since then reaffirmed the decision of the first cost congress.

The cost of anything is the sum total of all the expenses incident to its production. While it is true that the printer does not produce time, in a literal sense, it is equally true that he measures the greater part of his product in units of time. In a word, the printer sells time. A man will perform a certain task in an hour of time. That is, he will produce in the neighborhood of a thousand impressions on a press; will set about three thousand ems of type on a typesetting machine; will fold about seven hundred sheets of paper one fold, and so on. These quantities vary with the class or kind of work and with the individual; hence, if we always figure on the same output per hour of any sort of work we will often fly far afield. Again, much work cannot be measured in units of output, and so, of course, the only basis for figuring is the hour. We must, therefore, have accurate knowledge of the cost of an hour of time in each department, for otherwise we have no way of knowing what a given amount of time has cost nor what it should sell for.

Now as everything the printer sells aside from stock is the time or hours required for the production of the print-

191.3

[illegible]

There are twenty possible hours, of which ten are productive, and of those productive

Departments

ing ordered by his customers, we will not be misunderstood, we are sure, if for the sake of convenience we say he produces hours. The reader will know that we really mean labor measured in hours.

With this explanation we will take up the expense items enumerated on the monthly cost statement. The first item is the pay roll. It needs no explanation other than to call attention to the fact that a salary commensurate with the responsibility of the position must be assigned the owner or manager and included with the office pay roll. Some owners pay their employees and then take for themselves what is left after liquidating the other bills. This is wrong. Pay yourself a good salary, and get the money every pay day.

It would seem that to mention again the fact that rent is a chargeable item of expense even tho the premises are owned by the concern, would be unnecessary, in view of all that has been said and written on the subject. Nevertheless, the writer knows of printing concerns of considerable size which, because they own the buildings they occupy, do not include rent with the other expenses. The principle is so well settled that rent is to be charged in any event that we will not discuss the point further than to say that if the company owns the real estate occupied, its full rental value (at least six per cent on the investment after all upkeep and other expenses are paid) is to be included with the other expenses of the business. Also, where a printer tenant leases an entire building or floor, and then by subletting reduces his own rental outlay to a figure below the fair rental value of the space he occupies, the difference between his actual

outlay and the fair rental value is his own profit, and it must not be given away in the shape of lower prices.

Light and power expense must, in the nature of things, be divided somewhat arbitrarily among the several departments and the different machines. Heat expense may well be divided on the basis of floor space. So far as light is concerned, it would be practically impossible to get exact figures showing the units of electricity or feet of gas used in each department and sub-department unless individual meters are installed all over the plant. The value of such knowledge is not sufficient to justify the expense of gaining it. Similarly, this is true of power. A cylinder press, for example, requires more power when the form is large and the impression heavy than with a small form and light impression. A direct-connected motor carries a much heavier load when the machine is starting than when it is running. Motors are designed to take care of decided variations in the load, and economy demands a motor of four or five horsepower for a normal load of three horsepower. Nevertheless the really experienced man will be able so fairly to apportion light and power expenses that the factor of error will be but a small fraction of one per cent. To reach perfect accuracy in these matters would mean the unwinding of miles and miles of red tape at a cost of thousands of dollars, and when the tape was unwound and the money spent we would have learned nothing of value. Cut out the fractions; take the next cent higher. To do so gives us a small "factor of safety," as the mechanical engineer would say.

Insurance is a charge based on the investment. It is a

PRESSWORK

Cylinders
ACylinders
BPlatens
CPlatens
D

ter

department placed on the first footing-line using the second footing-line for the grand totals
(over)

Insurance, interest and direct expense 91

certain per cent of the investment in equipment. Find this per cent and apply it to the several departments. Except possibly in the very large plant it is not worth while to separate the insurance on equipment from that on "work in process, and finished but not delivered." Specific insurance on stock is a charge against stock, and is included in the percentage to cover cost of handling, which we add to the first cost of stock.

Interest is charged at the rate of six per cent per annum on the investment in each department. The same rate is charged on the average cash working capital and on the average amount of money outstanding in the shape of bills and accounts receivable.

Department direct expense is any small expense incident to the operation of a department. It includes rollers, tympan paper, and the like, in the press-room; glue, paste, ruling-inks, and the like, in the bindery; fragile faces of the type, copper thin spaces, page cord, and the like, in the composing-room. Many bookkeepers take care of all these items in one "general expense" account. So that no change in method will be necessary when this is the practice, we have provided a sheet called "department direct expense," one side of which is shown herewith; the reverse side differs only in that it takes care of additional departments. The one who O.K.s a bill notes on it the department the item is to be charged against, and the bookkeeper or other person to whom the duty falls sees that the amount is entered on the department direct-expense sheet in the proper column.

Spoilage we cannot escape from. For a spoiled job make out a job ticket the same as for new work, mark-

ing it "spoiled job" and charging it to the department responsible for the spoilage.

Bad debts. What shop is free from them? Experience shows us that in the average shop one per cent of the gross business will about take care of bad debts.

Perhaps you have no legal expense. Suffer long before incurring any.

Telephones and telegraphing; advertising and dead-head jobs; office stationery. These items are self-explanatory.

Public enterprises, association dues, etc. This is important. Along with other business men you must be public-spirited and share with others the work and expense incident to public enterprises. But don't forget to include such expenses with the other expenses of your business. You belong to an association of printers because it pays to be a member. Membership—meeting and exchanging views with other printers—makes you a better citizen, a better business man, a better and more efficient printer. Your membership enables you to give your customers better service and better printing, and therefore it directly and largely benefits them. This is true because all knowledge is accumulated experience; by association you learn from others and they learn from you. It is right and proper, therefore, that association dues and assessments, attendance at local meetings and banquets, trips to national and state conventions of printers, and all other association expenses, be included with and made a part of the expense of doing business. In this way the expense of membership in printers' organizations is passed along to "the ultimate consumer." Every up-to-date business man in other lines is doing this, and

it is right that he should. And it is also right for the printer. Besides, every time you buy a ream of paper, a font of type, a pound of ink, and anything else for your plant, you pay a part of the expense of maintaining his national organization of the man you buy from; for, as stated above, he includes all such expenses with the other expenses of his business, adding a small percentage to the selling price of each article sold. Are you doing this? If not, begin now.

Postage, car fare, taxes. These are items you of course include with the other expenses. There may be other things, also, in addition to those enumerated. If so, do not fail to add them to the list.

Depreciation is last on the list. It is one of the largest items of printing-office expense, and yet it is very often ignored entirely by the printer without a cost system. Depreciation and interest, the two items most commonly omitted when the printer with no cost system attempts to calculate his cost, amount to about nineteen per cent of the value of the plant. We charge off ten per cent for depreciation on everything in the plant except type, brass rule, leads, slugs, metal furniture, and a few other items equally short-lived. If our investment in equipment is \$60,000, our type investment will not be far from \$12,000. Assuming that \$12,000 is the amount, \$48,000 is the sum invested in press-room and bindery and in composing-room equipment other than type. Ten per cent on \$48,000 is \$4,800; twenty-five per cent on \$12,000 is \$3,000; total depreciation, \$7,800. Interest on \$60,000 at six per cent is \$3,600. Add the interest to the depreciation and we have \$11,400, which is ex-

94 The amount of depreciation

actly nineteen per cent of the cost of the plant. A \$60,000 plant will do a business of about \$125,000 a year, tho it is perhaps capable of doing more. On this amount of business the interest and depreciation figured above are over nine per cent. It will be seen, therefore, that if a plant doing a good business omits depreciation and interest from its cost of production, it can on the average make prices ten per cent below those of others and at the same time claim to show a profit. This explains how it is that a printing concern can do business for years with selling prices far below the profit line. It is merely a case of giving the plant away by making the customers a present of the money that should be used to take care of depreciation and interest, and often insurance, taxes and the owner's salary. Besides, when such a plant is finally forced to quit, it usually is found to be heavily in debt, the indebtedness often being equal to the first cost of the plant.

I frequently hear objections to a depreciation charge of twenty-five per cent on type and ten per cent on the rest of the equipment. Some printers contend that these rates are too high; and to be frank, I thought so myself when the proposition was first made. I am convinced now that ten and twenty-five per cent are not a bit too high. Depreciation does not consist of wear and tear alone. Wear and tear hardly covers half the loss, as we will agree if the matter is examined into. A certain electrotyper purchased a new molding machine ten or eleven years ago. At the time it was considered to be the best machine of its kind on the market. It is no longer used, tho there has been no perceptible wearing of the

parts. It can now be sold only for junk. The loss in value is due to the fact that molding presses have been so greatly improved in the past ten years that competition forced the purchase of machines which can be operated more economically.

A hundred thousand impressions so wears the type in a form that it cannot again be used on even medium-grade work. Of course we electotype the long runs, but we do not plate the short ones, and a hundred runs of a thousand each will wear the type more than one run of a hundred thousand. True, we have a surplus of type, so that the same letters are not continually in use. Nevertheless, many characters are used so much oftener than others that they wear much faster, and as a consequence the font is soon ruined, for nearly all the characters wear sufficiently so that sorts of new type added to fonts will not work well with old letter. Here are two tests of the correctness of the above: (1) Go into the composing-room and look into the job cases, paying especial attention to the cap C, S and T boxes, and also to the lower-case e, n, o, t, a, period and comma boxes, and to any one of several other cap and lower-case boxes. What you see will convince you that further comment from me would be superfluous. (2) Pick up samples of the last few jobs turned out by you, and examine them critically for bad letters. If you fail to find any, yours is the exceptional shop that proves the rule. If you find a number of them, as you will in nine cases out of ten, remember that to get the work to look as well as it does the pressman was obliged to spend from a quarter more to double the time in make-ready that he would have put in had

the type been good, which means that you are paying out in extra wages far more money than twenty-five per cent depreciation on type amounts to.

Much more might be said concerning each one of the expense items. I believe, however, that these remarks will prove to the thinking man that the expense items given should be taken into account, and that so far as charges are indicated we are really conservative.

FINDING THE HOUR COST

We have now taken the reader thru the various phases of cost-finding preliminary to finding the hour cost.

To find the hour cost for the month the cost clerk first enters in each department or sub-department column, after each expense item, the amount of such expense chargeable to the department, of course including the business office. The explanations above will show how the charges are arrived at. When all the expenses have been entered on the blank and the columns footed up, we are ready to distribute the business-office expense among the departments. The distribution is made on a strictly impartial percentage basis. Our reasons for adopting this system of distribution are explained in the chapter headed "Principles of the Standard Cost System," and need not be discussed here. To arrive at the distribution percentage we merely add together the department totals and divide the total into the total office expense. With imaginary figures I have filled out the office and five other columns of the cost-of-production sheet. The totals of the five columns, added together, give a grand total of \$4,126. We divide this sum into total office expense of \$1,344.95.

(We of course add two ciphers to the smaller figure.) The department expense does not divide evenly into the office expense, but it is near enough for all practical purposes. In the matter of this percentage, as with other things, splitting hairs will get us nowhere. To all intents and purposes the percentage is $32\frac{3}{5}\%$. That is, the business-office expense is $32\frac{3}{5}\%$ per cent of each department total. To prove this we need only add together the sums on the line, "Distribution of general expenses prorated in proportion to department cost," which gives us \$1,345.08—just thirteen cents more than the total office expense. Now it is clear that thirteen cents distributed over five departments will make no difference whatever in the hour cost of any of them.

We now add together the department total and the department's share of the office expense, which gives us the grand total department cost. In the composing-room (hand) the total is \$2,240.28. What is the hour cost? On our monthly statement of cost we have already posted, from the monthly summary sheet, the total number of productive hours worked in the department. We have nothing to sell except these productive hours; consequently they must bring a high enough price to pay all the expenses of the department and leave a profit in addition. Once we know the cost of one productive hour the selling price of any number of them follows as a matter of course. We find the cost of an hour by dividing the total productive hours into the total department cost. In this case 1,810 hours cost \$2,240.28, which gives us an hour cost of \$1.23 and a fraction. We disregard the fraction and take the next cent higher, which makes our hour cost for the

hand-composition department \$1.24. We disregard fractions and take the next cent higher because in practical work the figuring of fractions is a waste of time. Figuring fractions is the reddest kind of red tape.

The objection to the use of a cost system by every printer without one, is that to take care of it requires a great deal of time. Were we to follow the course advocated by most of the exponents of cost-finding, the objection would be valid. During a railway journey I met a Chicago printer. The conversation naturally turned to cost-finding, and my friend mentioned that his system kept three clerks busy. As indicating the size of his plant he mentioned that he was operating twelve cylinders and a number of platens. His, he said, was the standard system, and the blanks used were those used by the Chicago Ben Franklin Club. I told him that he had better revise his system and change the forms, as the work in his plant incident to cost-finding ought not to require all the time of even one clerk. At the time this conversation took place I was installing the standard system in a plant easily fifty per cent larger than that of my Chicago friend, using blanks substantially the same as those shown in this book. The young lady in charge has become an expert and has no difficulty in doing all the work connected with the cost system each day, in addition to which she attends to the private telephone exchange.

When a plant first installs a cost system certain problems will arise which will not seem easy of solution. Practically every one of them has faced other printers and has been satisfactorily solved. The next chapter will deal with some of these problems.

Chapter Eleven

General Information

DURING the first few months of the operation of the standard cost system various puzzling problems will arise. While it is of course possible that something entirely new will come up, the chances are a hundred to one that the same problem has presented itself many times in the past and that it has been correctly solved. Mention of some of these problems may well be made at this time.

The statement is often made that because the class of work in one plant differs from that done in another, the same cost system cannot be used for both. This is not the case. The same system will do for both. It is obvious that composition is composition, whether it be for a book, a catalog, a letterhead, a legal blank or what not. And the same thing is true of the work of every department. Presswork is none the less presswork because it is done on a calendar pad in a plant devoted to the printing of calendars instead of on a pamphlet in a plant doing general printing. Folding can be called nothing else, even tho it is a letter circular instead of a pamphlet. The most that can be said is, if there are more departments in a plant than we mention, we must provide time tickets and summary sheets to take care of the work of the additional departments. This, however, in no way changes the prin-

ciples of the standard cost system. The system will show the exact cost of production in any and every plant.

COMPOSING-ROOM

On monotype work the hour cost is arrived at by adding together the keyboard-hour cost and the caster-hour cost. This is done because neither machine can run without the other. If, as is often the case, the keyboard produces more in a given time than the caster can cast in the same time, the keyboard must, at some time, wait until the caster catches up, as otherwise some of the keyboard output would never be cast. Again, if the caster runs ahead of the keyboard it must inevitably stop for lack of copy before very long. True, when there is no copy (perforated paper ribbon) for the caster the machine may be used for casting sorts; but when regular composition is being done the time charge should be the time of whichever of the two machines requires, on a given job, the greater number of hours. If a job requires eight hours on the keyboard and ten hours on the caster, charge ten hours monotype time on the job record of cost; for, as stated above, the machine that gets thru first must wait on the other some time. In this respect the linotype is the same as the monotype, the waiting time passing unnoticed because it occurs on each line set, and it amounts, consequently, to but a few seconds at each interval. But it is there just the same, and on every line either the casting mechanism waits on the operator or the operator waits on the mechanism. The output in ems on the monotype is the amount of matter set by the caster; for the caster can only set the amount given it by the keyboard, which

means, whether output is counted in hours or ems, the machine which gets ahead must wait for the other. The quick and easy way to ascertain the caster output is to attach a counting machine to it, connecting it with the lever that lifts the line rule.

When monotypes or linotypes are used for casting sorts, display type, borders, spacing material, and the like, the time required for such work is productive so far as the machines are concerned, and the cost of the time is a charge against the composing-room. If the work is casting sorts which will not be distributed, the cost of the time is a direct department expense against the composing-room. If the work is casting display type, or something that will become a part of the composing-room equipment, the cost is not an expense item, but is an investment in material, and the charge must be made just as it would be were the material purchased from a regular dealer. In other words, credit the machine-room and debit the hand-composition room, the charge being a direct department expense if the material is not to be distributed and an equipment expense if it becomes a part of the general equipment of the hand-composition room.

The metal used for sorts and spacing material need not be taken into account, for it does not leave the plant. True, it leaves the machine-room and is held for a considerable period of time in the hand-composition department; but to credit the machine-room and debit the hand department smacks too much of red tape, in view of the fact that all such metal is sooner or later returned to the machines. Were we to charge such metal to the machine-room, we would be inconsistent did we not in

the same way charge the metal in ordinary composition which is kept standing. To make such charges would be to use yards of useless red tape costing far more than it would amount to.

PRESS-ROOM

The press, no matter what its make or style, is the unit in the press-room. Straight time is the basis. That is, if there are ten cylinder presses and the plant is working eight hours a day, there will be eighty hours of press time, equivalent to one hundred per cent. The difference between this eighty hours and the number of hours sold is the non-productive time. If forty-eight of the eighty hours are productive, the productive time is sixty per cent, because forty-eight hours are $\frac{60}{100}$ of eighty hours, and the non-productive time, thirty-two hours, is $\frac{40}{100}$ of eighty hours, or forty per cent. If the productive time is forty-eight hours, the non-productive must be considered thirty-two hours, whether a full force of men is at work or not.

While straight press time is the basis of figuring productive and non-productive time, an exception is made when one or more machines are taken out of use but allowed to remain in the press-room. In such a case the machine covered up is not considered in making up the total time; but interest on the investment, rent, insurance, depreciation, and any other charges it is responsible for, are to be absorbed thru general department expense.

Several times in the past few years mention has been made of the curious fact that time tickets showed more make-ready time on a given job when business was rushing and the house filled with work than was shown on the same

job when trade was dull. It was explained fully in my pamphlet, "General Information Regarding the Use of the U. T. A. Standard Simplified Cost-Finding System," published in July, 1911, by the United Typothetæ of America. The matter is important, and as no more concise explanation has appeared than that made by me in the U. T. A. pamphlet, I reproduce it here; for, in addition to explaining, it instructs the cost accountant in the course to take under certain conditions: "When a floorman or pressman with time on his hands helps a fellow pressman with make-ready, the time spent in helping with the make-ready on another's press is to be entered on the helper's individual ticket as individual ('i') time put in on the job the other man is working on; but, while it is individual time, it must be charged on the job record as press time and at the regular press hour-rate. To illustrate why this is to be done, we will take a case where Smith, running two presses, is given a big catalog full of halftones. Jones, running two presses alongside of Smith's, has considerable idle time on his hands and helps Smith with the make-ready, cutting down the time so far as Smith's presses are concerned by, say, a third. Six months later the same job comes in, but conditions have changed radically and Smith is obliged to do all the make-ready work. When Jones helped him the time charge for make-ready (press time) was two hundred hours. Doing it alone, the press was held for three hundred hours (press time). Now the time of make-ready is the same in both cases, and if the office is so efficiently managed that it can save a lot of press hours by having men help each other, the fat belongs to the office and not to the customer. Besides,

the plan outlined gives practical uniformity in make-ready time, whereas under the method ordinarily employed it varies greatly. The same plan is to be followed where halftones are proved up on platen presses and overlays made for them at odd times while the regular work is going on."

THE BINDERY

Bindery handwork is classified in accordance with the wages paid the operative. This is done because there is such a wide variation in wages. Three classes will ordinarily suffice—classes A, B and C. In class A include all hand workers receiving sixteen dollars a week or more; in class B, all those receiving eight dollars a week or more but less than sixteen dollars; in class C, all those receiving less than eight dollars a week. It makes no difference whether the operatives are girls or men. This is speaking generally. In the small bindery a single classification often suffices.

In large binderies the classification is best made according to the kind of work. The work done by low-priced help, such as folding, gathering, interleaving, padding, hand sewing and the like, will be class C; or some distinctive name may be given it. There will be departments of ruling, wire stitching, machine folding, cutting, forwarding, finishing, and anything else done in sufficient volume to make a department advisable.

Cost accountants are not agreed as to the best way to take care of bindery machinery, and there is a tendency to split hairs. This is because there is so much bindery machinery which is used but a comparatively short time during a month. Many bindery machines are used so

little that the hour cost mounts to a prohibitive figure—to a figure which no customer can rightfully be asked to pay. Again, there are bindery machines, such as hand-power round-cornerers and hand numbering machines, which cost very little. It would be just as sensible to fix an hour rate for such a bindery machine as it would be to do so for a mitering machine in the composing-room; and yet there are men posing as cost experts who insist upon doing it. Such a course is sheer nonsense. It is “redtapitis” in its most virulent form.

There must be a standard rate for bindery machinery, just as there is for presses and composing machines. No matter how far above the standard rate the cost may be in a given shop, but little more than the standard rate can be charged. Our problem is, therefore, how shall we arrive at an agreement as to what the standard rate shall be?

The standard hour cost for bindery machinery must be the average cost in binderies doing a sufficient volume of business to keep the machinery running, on the average, more than fifty per cent of the time. Such a bindery will be of considerable size; even it, however, will quite likely include machines in its equipment which on the average run considerably less than fifty per cent of the time. If in such a bindery there are machines of this character, they should be classed as tools used by hand workers, and the expense they are responsible for absorbed thru the department overhead expense. For instance, no one with a real knowledge of cost accounting would seriously contend that we should ascertain the hour cost of a table-shears. Nor can we say, except in a general way, which

machines shall be considered as tools and which shall be operated on a machine-hour-cost basis, for this is a matter which the conditions in the individual plant must determine. In a general way it may be said that folding machines, ruling machines, cutters, stitchers, perforators, gathering machines and the like should be operated on the machine-hour-cost basis, with the machine as the unit, and the possible number of hours of straight time taken into account in determining the number of productive and non-productive hours accounted for in a given period of time. Now, while the machine is the real unit—that is, the thing the hour cost of which is determined—the daily time ticket will in most instances be made out as tho the workman were the unit; for the operation numbers show which machine he was working on and the kind of work he was doing. The ticket, in other words, will be a record of the work done by the workman and will show what machines he worked on and how long he was employed on each. Machine hours are what we want on all machines; to get them, a ticket showing the activities of the operative is generally sufficient in the bindery, tho on folding machines, where one man looks after several, a ticket must be made out for each. In order that the actual time a given machine is in operation may be known, we distinguish helper time from the actual operation time. Thus a girl operating a wire stitcher enters her time as “stitching,” while those assisting her use the item, “helper on stitcher”; a ruling-machine operator, the number of one of the four ruling operations; while a feeder uses the operation, “feeding ruling machine.”

High-grade bindery help must sometimes be put on work that is generally done by operatives who are paid comparatively low wages. We must keep some sort of a force together even in dull times, and it is better to give the men low-grade work than to allow them to stand idle. When this is necessary the cost of the work is figured at the rate found to be correct for the class it belongs in, and the difference between that cost and the cost of it when done by the high-priced help is a direct department expense which the entire bindery must take care of. High-priced men are kept at work during dull times so as to keep the force together and enable the plant efficiently to handle the work its patrons are certain to send in a little later on. It is right and proper that all the patrons pay a part of the cost of keeping the force together, and this they do when the difference between the hour cost of low-grade work and the hour cost of the same work when done by high-priced men is absorbed thru the department overhead expenses. All bindery expenses which are of such a nature that they cannot be specifically charged against individual departments are to be prorated over the several bindery departments in the same way that business-office expenses are apportioned among the main departments of the plant. The same is true of such expenses in any department.

THE SMALL PLANT

In the small plant a man may set type, run a press, do check binding, make pads, and work at many other things. As a compositor his time costs, say, a dollar an hour. It costs perhaps sixty cents when he is making

pads, for he has a smaller investment and consequently lower fixed charges to be reckoned against him, the exact cost, of course, being shown by the cost system. But basing the cost on the prevailing average rate of wages paid for such work as padding, the rate will be about thirty cents an hour. The difference between the thirty cents it should cost and the sixty cents that it does cost for such work as padding will be charged against the plant as a whole as a general overhead expense to be absorbed by all the departments with the other business-office expenses. This principle applies to all the work done in the small plant. The prevailing rates of wages for any one of the several kinds of work are or readily can be known; so that, by figuring from the standpoint of prevailing wages, the average hour cost will be found, when we can quickly determine what proportion of the small-shop cost should be carried to the general overhead expense. This method will add slightly to the hour costs of the small shop; but the addition will not, as a general thing, force the small-shop costs much above those of the large plant. To illustrate the principle more clearly, let us say, for example, that during the month the normal cost on platens is sixty cents, on bindery work thirty cents, and on composition one dollar, the average wages paid feeders, bindery girls and compositors being the basis.

In our small shop one man does all the work, and when the basis is the wages he receives, we find, say, that his time costs eighty cents on the platens and sixty cents on the bindery work, while the composition cost is unchanged. Our man, we will assume, puts in one hun-

dred and sixty hours of productive time during the month, ninety on composition, forty on presswork, and thirty on bindery work. We have, then, eight dollars from the press-room and nine dollars from the bindery to throw into the general overhead, which, prorated in the regular way, will add but little to the normal. You see, do you not, where we get the eight and nine dollars? Forty hours of presswork at the normal cost of sixty cents is twenty-four dollars; at eighty cents it is thirty-two dollars; difference, eight dollars. Thirty hours of bindery work at thirty cents is nine dollars; at sixty cents, eighteen dollars; difference, nine dollars.

Chapter Twelve

Analyzing Unsatisfactory Jobs

THE use of the standard cost system largely increases the amount of work given the printer without an advance quotation. But, even so, we will always be obliged to bid, in competition with others, on many jobs, especially the larger ones.

The price named in all printing bids has always been arrived at by a process of guessing, coupled, of course, with more or less experience. We have been obliged to guess because none of us has kept accurate records of production—or, better, of time requirements. In short, until very recently none of us has made a scientific study of the mechanical end of printing. I know full well that he who reads this will say that our statement is true of practically all his competitors, but that it is not true of himself. But it is true—true of every one of us. How can it be otherwise when there are practically no plants in which record blanks are used that will permit the workpeople to give us real records? In the past our estimates, if based on time at all, were, exclusive of stock, in some such crude shape as this:

Hand composition, 30 hrs.	\$30.00
Presswork, 10,000 impressions, 10 hrs.	12.50
Bindery, er—er— Oh, hang it, say \$2.50 per M . . .	12.50
Total	\$55.00

But most of us never bothered with such inconsequential things as time. We said, "I can set that job for about \$30.00. Ten thousand impressions at \$1.25 a thousand is \$12.50; and binding 5,000 pamphlets at \$2.50 a thousand is \$12.50. I'll quote him \$55.00." To which, of course, the stock would be added, usually at cost.

We used no estimate blank. Most of us used no time tickets; or, if we did, they would show nothing that would give us a clew to the mystery of the murder of the time alleged to have been spent on any job. Nor did we have job records, nor anything else that would give us real information.

Now, dear reader, isn't the above picture true of most of the plants you are familiar with? Isn't it true that in your own case your records do not show all the operations on the jobs printed and the exact amount of time required for each operation?

Let us suppose the work on which the above crude estimate was made to have been a small eight-page pamphlet. The estimate in that case should look something like this:

Estimate for John Jones & Co., August 2, 1913. Made by C. R. M. Description: 5,000 pamphlets, 6 x 4½, 8 pages. No cover. Stock: No. 2 white enamel, 25 x 38, 80-lb., at 7c. Rule border on each page and trademark on first page in red. Remainder black. Halftones furnished. Set by hand on account of piece-fractions, in 8-point leaded. Use plate gothic for display. Customer will call for work.

Stock, including waste, 850 sheets, 17½ rms.,	COST	SELL
136-lb. at 7c.	\$ 9.52	
Add ten per cent for cost of handling95	\$ 13.10
	<hr/>	
	\$10.47	

A way to estimate

	COST	SELL
Hand composition, including border form, 25 hrs. at \$1.20	\$30.00	
Imposition, 2 hrs. at \$1.20	2.40	
Lock-up, two 8-page forms, 4 hrs. at \$1.20 . .	4.80	\$ 46.50
	<hr/>	
	\$37.20	
Make-ready, red and black, 6 hrs. at \$1.40 (pony)	\$ 8.40	
Running red and black, 9 hrs. at \$1.40 . . .	12.60	
Wash-up for red, 1 hr. at \$1.40	1.40	
Red ink, ½ lb. at \$1.00; black, 2 lbs. at \$1.00	2.50	30.13
	<hr/>	
	\$24.90	
Folding, hand, 10,000 folds, 15 hrs. at 30c. . .	\$ 4.50	
Stitching 5,000 pamphlets, 6 hrs. at 80c. . .	4.80	
Trimming, 3 hrs. at \$1.00.	3.00	15.38
	<hr/>	
	\$12.30	\$105.11
Total cost, \$84.87. Quote, \$105.		

The difference between this estimate and the old-fashioned ones above is that none of the operations on this simple job is omitted. Nevertheless, a number of things may arise which might extend the actual time far beyond our estimate. Let us assume that our time estimates are practically correct, but that when the work is finished the records show that a great deal more time was taken. In such a case could you, reader, discover the cause of the delay from your present records? For instance, the instructions call for plate-gothic display. Now if there happens to be no plate gothic in the cases when the work comes in, the compositor must hunt it up—hustle for sorts, as we say in the composing-room. Again, the trademark cut called for may have been lost, and anywhere from ten minutes to several hours may be spent

in finding it. These and many other things may happen, and when they do the time and money they cost are lost beyond recall. A case in point occurred a day or two ago in a large plant in which the standard system is being installed as this is written. The manager called me in and said it seemed to him that we might simplify matters somewhat. "For instance," said he, "why make note of all these composing-room items? Why not group composition, corrections, make-up, lock-up, and perhaps several more, under one number, 21? In our shop these things are often done by the same man, and for them all the hour cost is the same."

"Our reason for not grouping the operations as you suggest," I replied, "is that if we should do so we could never tell why it was that fifteen hours of composing-room time were spent on the job which in our estimate we allowed ten hours for."

"Yes; but take this first ticket," he said. "Why should this man put down operation No. 23, 'hunting for electros,' when in reality it is as much a part of lock-up as it would be if he went to the live-stone for a job he was to lock up—— Thunder and lightning! How much time has he got down for that?"

"Just forty-two minutes," said I. "If he had been able to find those plates without a hunt for them, he would have made no note of that part of the time at all; it would all have been entered up as lock-up time. But he couldn't find them without a search, and so, by this simple entry, he has informed you of the fact that thru no fault of his own he was obliged to lose time. This entry explains to you better than I could do it why we

divide composing-room time into all these operations. At least thirty-seven of those forty-two minutes were absolutely wasted. Each minute cost you in cash at least two cents. That is, it has cost you fully seventy-four cents to find those plates, and you can't charge the amount to the customer, because this is a regular job on which you have quoted a regular price to the customer. This is a little thing, to be sure; but the aggregate of a lot of little things is appalling. Besides, how many big ones, similar in character, have gone thru unnoticed? And if, under your old system, you had noticed that the time was too long, knowing that the locking up of four plates was the only composing-room work, what would you have done?"

"I see your point," the manager replied. "Under the old method the time turned in, if all of it had been put on the ticket, would have been an hour and a quarter; and had I noticed that the amount was excessive I would have written a note to the superintendent asking for an explanation. He would have neglected his other duties long enough to take the matter up with the foreman of the composing-room, when the two of them would have put in ten or fifteen minutes talking the matter over, after which the compositor would have been called in and asked to explain. Of course, as I do not get the job records until the work is finished, the matter would not have been called to the attention of any one until after several days had elapsed, and the chances are that the compositor would then have been unable to remember why it took so long, though without doubt he would have had an excuse of some kind. They always do. Under our

old plan we not only would have lost the time in the first place, but would have lost about as much more of more costly time trying to find out what caused the first loss. But I see now that with your system the matter is automatically brought to my attention without any extra work or loss of time on the part of anybody. I see, too, that if my idea of grouping these operations under one number were adopted, I would be losing one of the most valuable advantages of the cost system, as it would then show me nothing but the naked hour cost in a department. I shall take this job record and this time ticket into the factory right now, and call the men together and show them why I insist that they follow your instructions. There are just two places for everything: the right place and the wrong place. Had these plates been in the right place, that time would not have been wasted."

Now under the standard cost system as I have explained it in these chapters items of loss are brought to light that amount to a staggering total. Let us take the case of the man who lost the thirty-seven minutes, and see what effect that loss has upon his day's work from the standpoint of profit to the company. The man works $8\frac{1}{2}$ hours a day, or 510 minutes. He is on productive work little if any more than 60 per cent of his time—that is, not more than 306 minutes a day. The cost of his time is not less than \$1.20 per productive hour, or two cents a minute, which makes \$6.12 for the day. We ought to sell his time at an advance of 25 per cent over its cost, but don't because as yet we can't, owing to the fact that printers generally do not know what it costs to produce printing. Assuming that we do, however, the selling price would

be \$7.65, which gives a profit of \$1.53. Deducting the cost of the lost time, 74 cents, from this profit, and saying nothing about the profit we would have made had we sold the 37 minutes, we find our profit reduced to 79 cents—nearly 50 per cent. In other words, if the hour cost is \$1.20 in the composing-room, and a maximum profit of 25 per cent is figured on all work, it takes just 76½ minutes (1 hour 16½ minutes) of lost time to wipe out all profit, while any additional loss of time means an actual loss of money. These figures apply to shops operated under the best possible conditions. Think of the effect a little lost time has on the profits of the ordinary shop!

These are facts and figures which should receive careful attention. Watch the job records. Analyze every job which does not show a satisfactory profit, so that you will know why it falls short. Compare the actual time records with the estimates, and file samples of all sorts of work with actual records of time, so that you will have time data which will enable you to judge to a nicety the length of time that will be required for the production of work similar in character. If you will do this your records will soon be so complete that you will be able to cut out the guessing, and you will forget the old and unfounded superstition that "a job done in ten hours this month may require twenty hours next month;" for, while it is true that one man will do more work than another in a given length of time, and that a man will do more and better work some days than he will do others, it is equally true that the law of averages has never been and never will be repealed.

On the back of the job record of cost you will find data

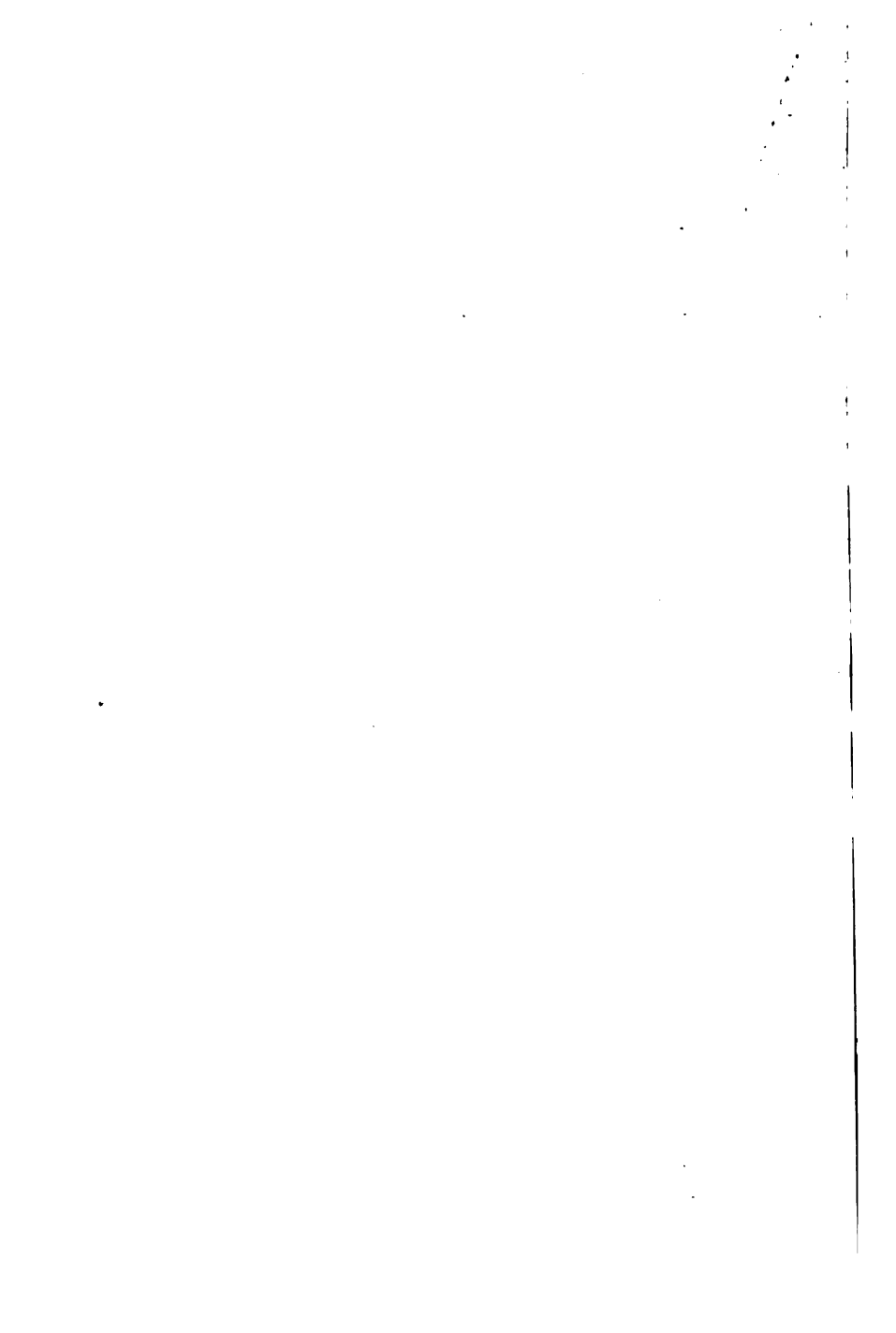
1913

ORK

Platen-C

Platen-D

the gain or loss for the entire plant



The condition of the business 117

so complete that you can subject any job to a critical analysis. That is, you will find it there if you install the standard cost system and use blanks substantially the same as those we have shown.

STATEMENT OF PROFIT AND LOSS

The average statement of the condition of the business of a printing concern, whether it be a monthly, quarterly or annual statement, merely shows, in a general way, whether the concern has more money, or more of the things which may be sold for money, than it had at the time of the last preceding statement. Such statements seldom take into account expense items such as interest and depreciation; or, if these items are included, the amount of money involved is merely guessed at. While it is no doubt true that there are printing-office proprietors who know how much money they have invested in their plants, it has never been my fortune to find one of them; and as it is impossible to know the amount of interest and depreciation expense if one does not know how much he has invested, there can be no question about the correctness of my statement that interest and depreciation charges are mostly pure guesswork.

Many and many a bookkeeper's statement has shown what purported to be fair profits right up to the time of a disastrous failure. True, in many lines of business the ordinary books of account can and do show the exact status of affairs; but this is not the case when the business is printing. We are confronted with problems which those in other lines are not called upon to solve.

Before a printing-office statement can show the true

118 The job records an inventory

condition of the business, an inventory of the unfinished work must be taken. No shop without a cost system can take an inventory of the kind which is worth the paper on which it is written. The best that can be done is to go thru the plant and estimate the amount of work done (time spent) on the various jobs in process, after which an estimate must be made of the value of the work already done. Estimates of the time spent on unfinished work are almost invariably at least fifty per cent out of the way; and so far as the value of the time is concerned, I have never yet found a printer without a cost system who was not twenty-five per cent at least too low in the matter of hour costs.

In offices using the standard cost system, on the other hand, no special inventory of work in process need ever be taken, for our job records of costs are of themselves a continuous inventory, inasmuch as they show the amount of unfinished work in the house at the close of every business day, while the cost system proper shows the exact value of each hour of time put in on work in process. It is only necessary, therefore, to have a blank on which may be summarized all the transactions for any given period in order that we may make out a really correct statement of the results of the business done during any given period. Such a blank is our statement of profit and loss, or, as some call it, "the manager's sheet." We show one side of it herewith. The reverse side is the same, except that additional departments are provided for.

The manager's sheet is not a cost blank, strictly speaking. Neither is it a financial statement. But it shows, by departments, the business done, what each department

is making or losing, and the gain or loss for the entire plant. It shows, too, the amount of business done by each salesman, and the resulting profit or loss in each department.

With our system, the value of the work done on all jobs in process can be quickly and accurately known at any time. It is simply a matter of adding together all the productive hours in each department, as shown by the job records of the work in process, and multiplying each total by the hour rate of the department. We make this simple calculation and then enter the amounts, by months, on the statement of profit and loss. We show a statement (for July) filled out for a single department. The date figures on the blank refer to the last day of the month of course, whether it be the 28th, 30th or 31st. Our statement shows the cost of all work chargeable to customers at the close of business July 31 to be \$6,940, of which \$1,400 was unfinished. When we deduct \$1,400, the cost of the work in process that was unfinished at the close of business July 31, we find that work to the amount of \$5,540 (cost) was billed out during the month. The selling price of this work was \$6,530, which leaves a profit of \$990. When it is remembered that our statement shows the exact cost of the work—the cost including wages, rent, office expense, interest, depreciation, spoiled work, bad debts, power, light, heat, and everything else—it will be seen that it tells the manager just what he wants to know, to wit, the exact profit made or loss sustained on the work sold during the period the statement covers, both by departments and as a whole. Ordinary books of account do not show this.

A valuable feature of our statement is that it calls attention to work which has been in the house for a long time. When a job begins to drag it soon becomes unprofitable even tho originally sold for a good price; for interest on the money tied up in it, the rent of the storage space required for it, and the value of the material it keeps out of use, soon amount to a total greater than any possible profit. Old jobs are called to the manager's attention by this blank, and he can take steps to hurry them to completion.

In the section of the blank devoted to salesmen a statement is made, by departments, of the business turned in by each man, and also of office sales. By merely using two lines for each salesman we can compare the cost of his business by departments with the selling price. The manager who takes the trouble to make these comparisons may as well prepare himself for some surprises, for he will find that the salesman selling the most printing is not always the one who makes the greatest amount of money for the house. He will find, too, that some salesmen are strong on selling composition at a profit, while others are more successful on work running largely to presswork or binding. With this knowledge he can specialize by assigning prospects, whose work runs largely to any one line, to the salesman most successful in selling that particular kind of printing-office work.

If the reader has made himself familiar with the explanations and instructions which have been given, he will now have a good working knowledge of cost-finding. He should, in fact, be able to install and successfully operate the standard system.

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